SLV-E400 EE
SLV-X500 IS/ME/SG
RMT-V153A

SERVICE MANUAL

East European Model
SLV-E400 EE
Israel Model
SLV-X500 IS
ME Model
SLV-X500 ME
E Model
SLV-X500 SG

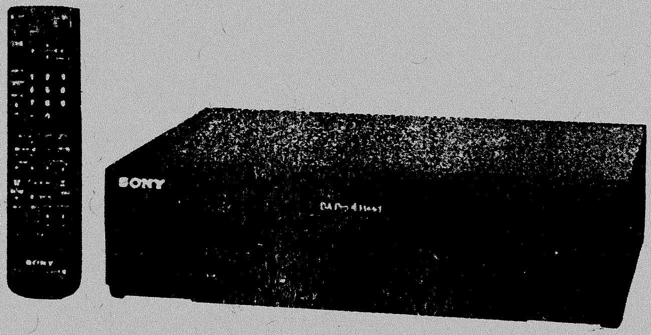

Photo: SLV-E400EE

VHS
PAL NTSC4.43

H MECHANISM

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS IV for MECHANICAL ADJUSTMENTS. (9-973-623-11)**

SPECIFICATIONS

System

Channel coverage
SLV-E400EE:
VHF R1 – R12, E2 – E12
UHF R21 – R69, E21 – E69
CATV S01 – S05, S1 – S41
SLV-X500IS, SLV-X500ME, SLV-X500SG:
VHF E2 – E12
UHF E21 – E69
CATV S01 – S05, S1 – S41

RF output signal
UHF channels 30 – 39

Aerial out
75-ohm asymmetrical aerial socket

Inputs and outputs

LINE IN
VIDEO IN, Phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, Phono jack (1)
Input level: –7.5 dBs (0 dBs = 0.775 Vrms)
Input impedance: more than 47 kilohms

LINE OUT
VIDEO OUT, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, Phono jack (1)
Output level: –7.5 dBs (0 dBs = 0.775 Vrms)
Output impedance: less than 10 kilohms

General

Power requirements
SLV-E400EE:
220 – 240 V AC, 50 Hz
SLV-X500IS, SLV-X500ME, SLV-X500SG:
110 – 240 V AC, 50/60 Hz

Power consumption
19 W

Operating temperature
5°C to 40°C

Storage temperature
– 20°C to 60°C

Dimensions
Approx. 355 x 100 x 277 mm (w/h/d)
including projecting parts and controls

Mass
Approx. 4.2 kg

Supplied accessories

Remote commander (1)
R6 (size AA) batteries (2)
Aerial cable (1)
Mains lead (1)
Plug adaptor (1) *(SLV-X500SG, SLV-X500ME)*

Design and specifications are subject to change without notice.

MICROFILM

VIDEO CASSETTE RECORDER

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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SERVICE NOTE

1. DO NOT LIFT UP BY HOLDING FL TOP PLATE AS SHOWN BELOW.

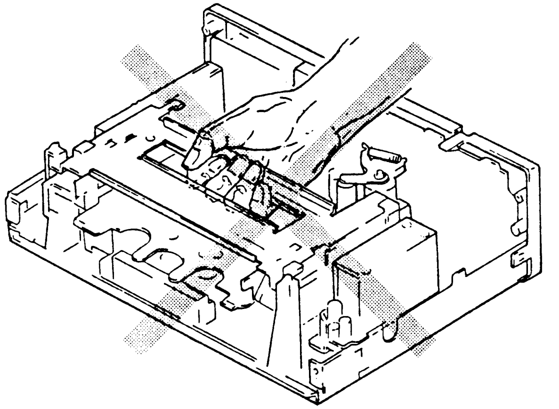


Fig. 1

2. UPPER DRUM REPLACEMENT

2-1. Removal of Upper Drum

1) Remove the screw ❶ (3 × 8) and take out the ground shaft assembly ❷. (See Fig. 2.)
2) Completely remove the rotary upper drum board and desolder the soldering indicated by the arrows.
3) Remove two screw ❸ (PSW3 × 8) and take out the rotary upper drum in the arrow direction Ⓐ. (See Fig. 3.)
   If it difficult, remove by shaking the rotary upper drum gradually.

Note: If the drum can not be removed, check wheater the solders have been removed or not again.

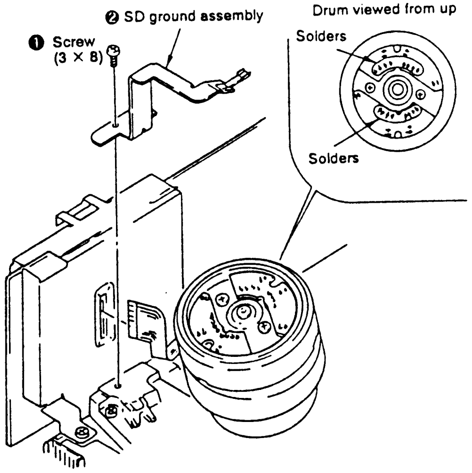


Fig. 2

2-2. Mounting Upper Drum

1) When inserting the rotary drum into the lower drum, be careful not to blur the contacting surface with fingerprint or the like.
2) Mount the rotaly upper drum board by aligning marked ➡ with marked ⇄ of rotary transformer board (lower drum) so that the screw holes of both upper and lower drums match. (See Fig. 3.)
3) If it is difficult, mount the upper drum by shaking it gradually.
   Note: Be careful not to damage the head. Make sure that the upper drum is tightly inserted.
4) Tighten two screws ❸ (PSW3 × 8). (See Fig. 3.)
   Note: Temporary tighten two screws. After making sure that upper drum is tightly inserted, tighten the screws.
5) Solder points on the board of the rotary upper drum.
6) Fix the ground shaft assembly ❷ using the screw ❶ (3 × 8) so that the protrusin of ground shaft assembly end contacts the center of the drum shaft.
   Note: When attaching the ground shaft assembly ❷, be care- ful not to apply force to the spring section of it.

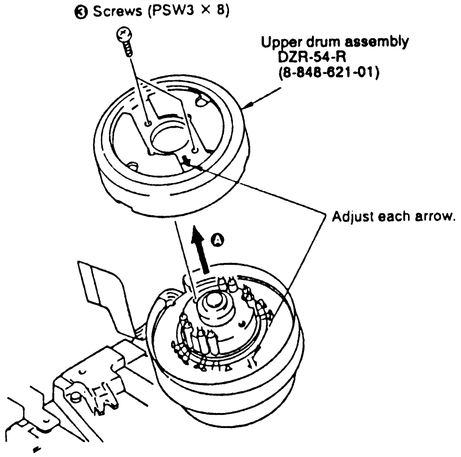


Fig. 3

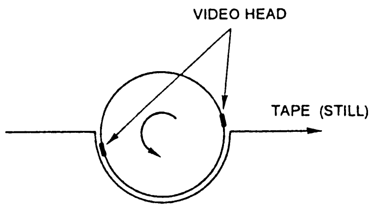
APC (ADAPTIVE PICTURE CONTROL)/ OPC (OPTIMUM PICTURE CONTROL) CIRCUIT

1. GENERAL

The magnetic characteristics of tape depend upon the kind of the tape (e. g. standard tape, high grade tape, etc.), so the quality of playback signal varies even at the same recording current.
APC/OPC is used to improve the quality of playback picture by setting automatically the recording current suitable for the characteristics of tape during recording and by changing the characteristics of circuit automatically according to PB RF signal level during playback.

2. RECORD MODE

2-1. ALGORITHM OF MEASUREMENT OF OPTIMUM RECORDING CURRENT



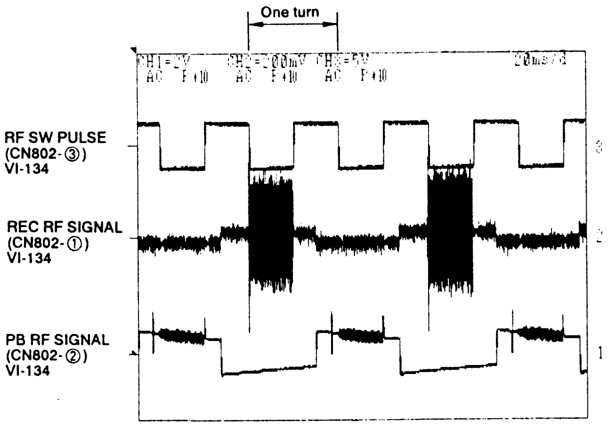
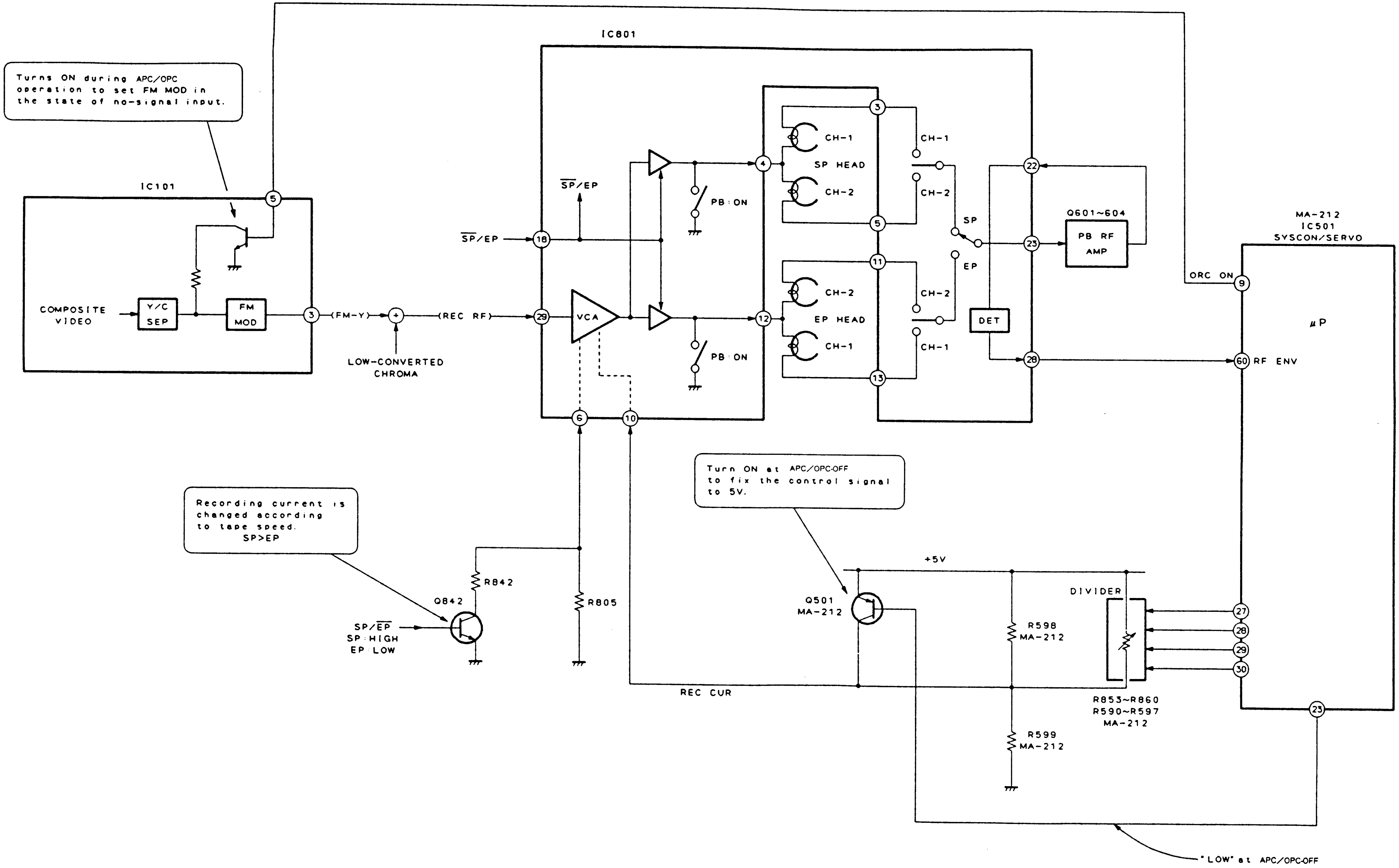


Fig. 4

1. Record the signal in the stop mode of tape.
2. Play the recorded signal with the same head, and measure the output signal level.
3. Next, change the recording current and measure the output signal level.
4. Repeat the above operation. The recording current, at which a maximum output signal level is measured, is optimum recording current.
5. Optimum recording current can be set quickly, because tape is not running (overlap recording is repeated).

2-2. APC/OPC OPERATION DURING RECORDING



Turns ON during APC/OPC operation to set FM MOD in the state of no-signal input.

Recording current is changed according to tape speed. SP>EP

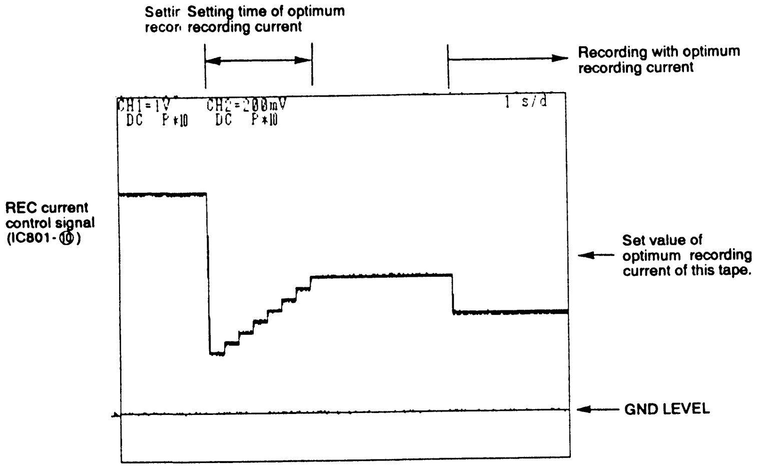
Turn ON at APC/OPC-OFF to fix the control signal to 5V.

"LOW" at APC/OPC-OFF

IC101
COMPOSITE VIDEO
Y/C SEP
FM MOD
(FM-Y)
LOW-CONVERTED CHROMA
(REC RF)
IC801
SP/EP
VCA
PB:ON
SP HEAD
EP HEAD
CH-1
CH-2
SP
EP
DET
Q601~604
PB RF AMP
MA-212
IC501
SYSCON/SERVO
ORC ON
µP
RF ENV
Q842
SP/EP
SP:HIGH
EP:LOW
R842
R805
REC CUR
Q501
MA-212
+5V
R598
R599
DIVIDER
R853~R860
R590~R597
3
4
5
6
9
10
11
12
13
18
22
23
27
28
29
30
60

2-3. OPERATION FLOW

1. When a cassette is inserted, it is automatically loaded while the tape is threaded. Under this condition, the unit is ready to accept a function input (the drum motor keeps running). When the function input is absent for about 5 minutes, the drum motor stops running and the unit is set in stop mode.
2. If the APC/OPC indicating lamp is OFF, it should be turned ON.
3. Press the REC button.
4. The CAM motor starts running and the mechanism is set in FWD mode, but the capstan motor should be left in stop mode.
5. The divider is driven by IC501 to change the gain control signal of VCA (Voltage Controlled Amplifier).



V: 1V/div
H: 1sec/div

Fig. 5

[Measurement of output level]

The recording current varies with changes in the control signal. Measure the playback output level at change of recording current.

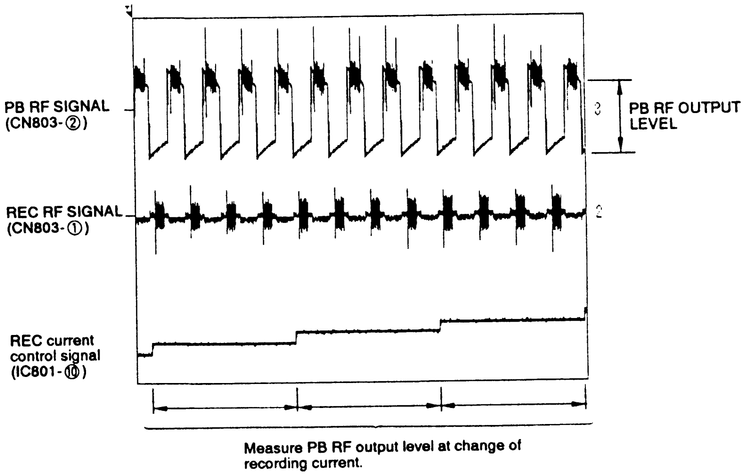


Fig. 6

6. Using the above procedure, obtain an optimum recording current for maximum PB RF signal level.

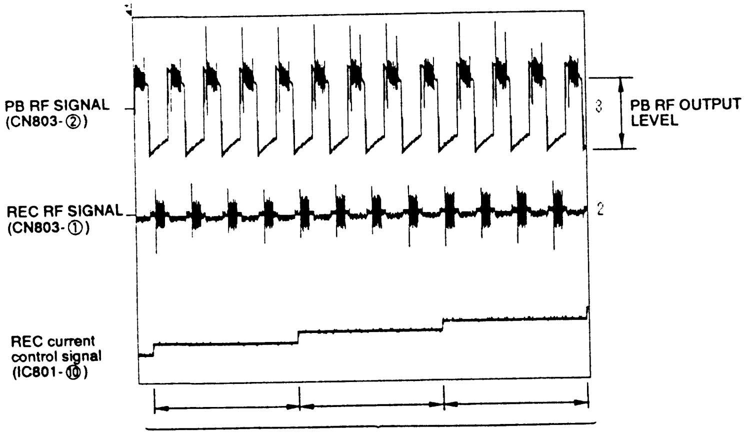
   The above completes the setting of optimum recording current.

7. Rewind the tape slightly.
8. Start recording.

Note: When the APC/OPC lamp on the fluorescent display window is OFF, press the REC button. Then, the unit starts recording (Item 7) without the above operation (Items 4 through 6).

[Measurement of output level]

The recording current varies with changes in the control signal. Measure the playback output level at change of recording current.



Measure PB RF output level at change of recording current.

Fig. 6

6. Using the above procedure, obtain an optimum recording current for maximum PB RF signal level.

   The above completes the setting of optimum recording current.

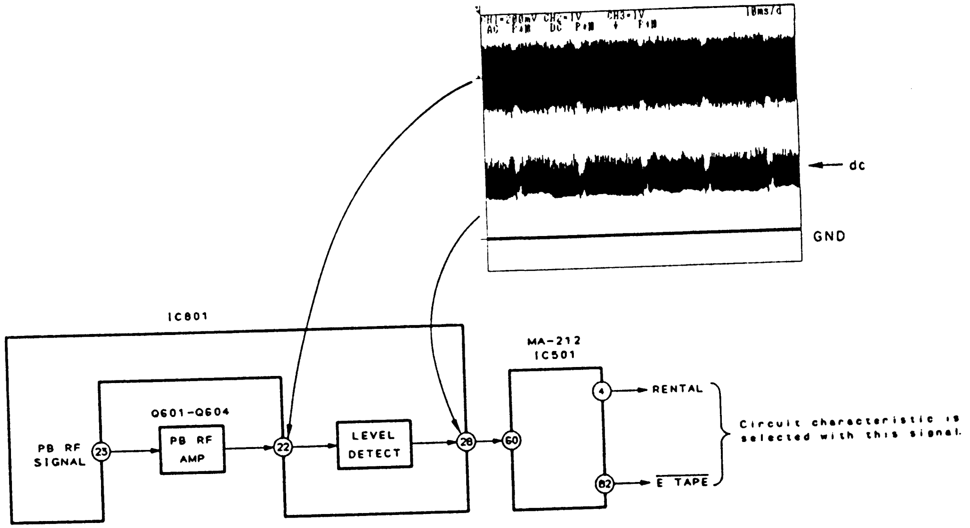
7. Rewind the tape slightly.
8. Start recording.

Note: When the APC/OPC lamp on the fluorescent display window is OFF, press the REC button. Then, the unit starts recording (Item 7) without the above operation (Items 4 through 6).

3. PLAYBACK MODE

3-1. APC/OPC OPERATION DURING PLAYBACK

1) The circuit characteristic is selected by the PB RF signal level.


dc
GND
IC801
MA-212
IC501
Q601-Q604
PB RF
SIGNAL
23
PB RF
AMP
22
LEVEL
DETECT
28
60
4
RENTAL
82
E TAPE
Circuit characteristic is selected with this signal.

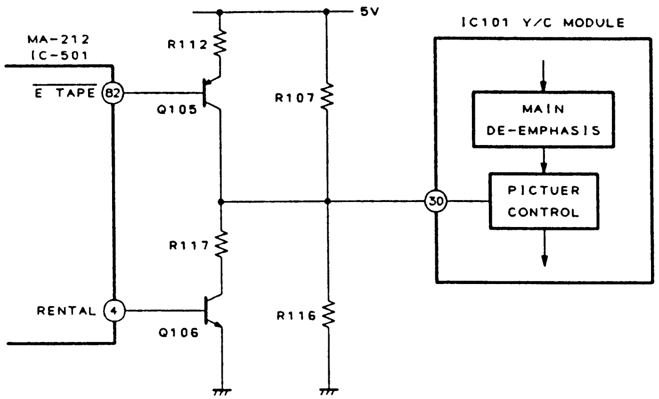
The circuit characteristic is changed by PB RF signal level and the position of MENU(On Screen Display) switch.

Fig. 7

2) PB RF signal level and select signal.
   - Set "APC/OPC ON" on the SET UP MENU screen

PB RF level / Select signal	High	Medium	Low
$\overline{\text{E TAPE}}$	L	H	H
RENTAL	L	L	H

3) Select signal and circuit characteristic.

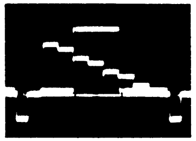

MA-212
IC-501
$\overline{\text{E TAPE}}$
82
R112
Q105
5V
R107
IC101 Y/C MODULE
MAIN
DE-EMPHASIS
PICTUER
CONTROL
30
R117
RENTAL
4
Q106
R116

Picture characteristic is operated by PICTURE CONTROL circuit which is controlled by DC level.

3-2. CHANGE OF CIRCUIT CHARACTERISTIC, AND WAVEFORM

SP mode, self-REC/PB, APC/OPC REC/PB: ON

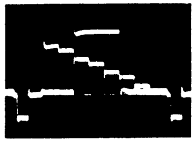
REC signal



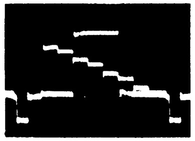
Note : Waveform measured at VIDEO LINE OUT terminal

PB mode

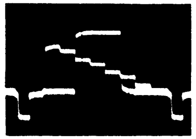
- APC/OPC ON



$\overline{\text{E TAPE}}$ ···· LOW
RENTAL ··· LOW



$\overline{\text{E TAPE}}$ ···· HIGH
RENTAL ··· LOW

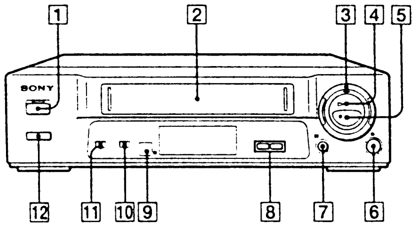


$\overline{\text{E TAPE}}$ ···· HIGH
RENTAL ··· HIGH

Index to parts and controls

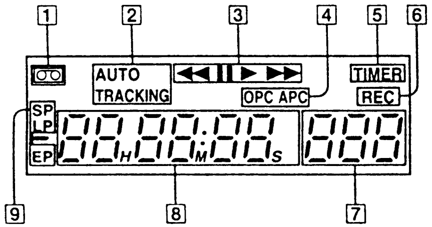
Refer to the pages indicated in ( ) for details.

Front panel



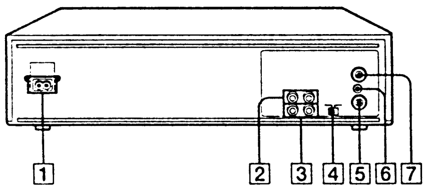
1 ON/STANDBY switch/indicator
2 Cassette compartment
3 DUAL MODE SHUTTLE ring (26)
4 ▷ PLAY button (26)
5 ■ STOP button
6 ● REC button (30)
7 ❚❚ PAUSE button (30)
8 PROGRAM +/– buttons
9 Remote sensor (6)
10 NTSC PB switch (16)
11 COLOR SYSTEM switch (16)
12 ⏏ EJECT button

Display window



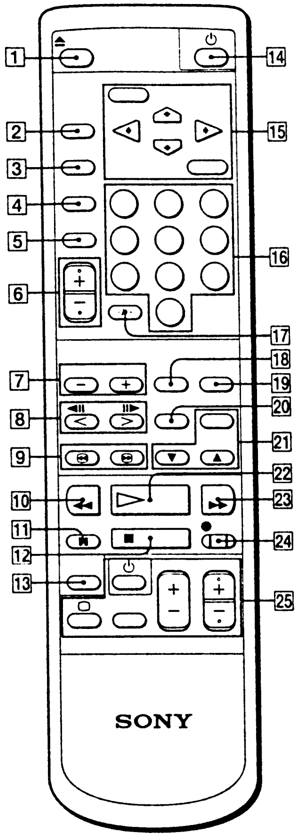
1 Tape indicator
2 AUTO TRACKING indicator (27)
3 Tape operation indicators
4 APC (Adaptive Picture Control) indicator (*SLV-X500IS/X500SG*) or OPC (Optimum Picture Control) indicator (*SLV-E400EE*) (28)
5 TIMER indicator (18, 21)
6 REC (recording) indicator
7 Line/programme position indicator
8 Time counter/clock (16)
9 Tape speed indicators (18)

Rear panel



1 AC IN connector (7)
2 LINE IN AUDIO/VIDEO jacks (29)
3 LINE OUT AUDIO/VIDEO jacks (7, 29)
4 TV SYSTEM switch (9)
5 AERIAL OUT connector (7)
6 RF CHANNEL screw (9)
7 AERIAL IN connector (7)

Remote commander



1 ⏏ EJECT button (15)
2 TIMER CLEAR button (23)
3 QUICK TIMER button (18)
4 DISPLAY button (16)
5 COUNTER RESET button (16)
6 PROG (programme) +/– button (8)
7 ❚▶ SLOW buttons (25)
8 ◀❚❚/❚❚▶ FRAME buttons (25)
9 ⏪/⏩ SEARCH buttons (15, 25)
10 ◀◀ REW (rewind) button (15, 25)
11 ❚❚ PAUSE button (15)
12 ■ STOP button (15)
13 SKIP button (25)
14 ⏻ (on/standby) button (8)
15 MENU operation buttons (10)
  MENU button
  CURSOR buttons (△/▽/◁/▷)
  EXECUTE button
16 Programme number buttons (11)
17 -/-- (ten's digit) button (11)
18 TAPE SPEED button (17)
19 INPUT SELECT button (8)
20 × 2 (double speed) button (25)
21 TRACKING buttons
  AUTO/MAN (manual) button (27)
  ▼/▲ NORMAL/SLOW STILL ADJUST buttons (25, 27)
22 ▷ PLAY button (15)
23 ▶▶ FF (fast-forward) button (15, 25)
24 ● REC (recording) button (17)
25 TV control buttons (6)
  ▢ (power on) button
  ⏻ (on/standby) button
  TV/VIDEO button
  VOL (volume) +/– button
  PROG (programme) +/– button

This section is extracted from SLV-E400EE/X500IS/X500SG instruction manual.

Welcome!

Thank you for purchasing the Sony Video Cassette Recorder (VCR). Here are some of the features you'll enjoy with your VCR:

- Adaptive Picture Control (APC) (*SLV-X500IS/X500SG*)/Optimum Picture Control (OPC) (*SLV-E400EE*) that automatically optimises recording and playback performance
- Dual Mode Shuttle (DMS) ring for easy playback and search operations

Compatible colour systems

- This VCR is designed to record and play back using the PAL and MESECAM colour systems (system B/G and D/K). Recording of video sources based on other colour systems cannot be guaranteed.
- Tapes recorded with the NTSC colour system can be played back on this VCR using a TV or a colour monitor for the PAL colour system.

Checking your model name

The instructions in this manual are for the SLV-E400EE/SLV-X500IS/ SLV-X500SG. Check your model number by looking at the rear panel of your VCR. The SLV-X500IS is the model used for illustration purposes. Any difference in operation is clearly indicated in the text, for example, "*SLV-X500SG only.*"

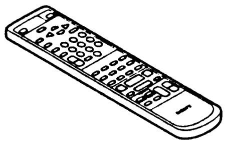
Types of differences

Feature \ Model	E400EE	X500IS	X500SG
Reducing streaks and/ or snow	—	●	●
APC (Adaptive Picture Control)	—	●	●
OPC (Optimum Picture Control)	●	—	—

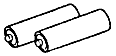
Step 1 Unpacking

Check that you have the following items:

- **Remote commander**

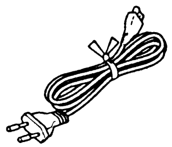


- **R6 (size AA) batteries**

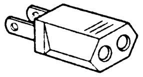


- **Aerial cable**

- **Mains lead**

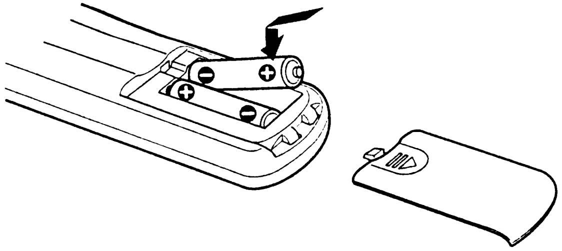


- **Plug adaptor (*SLV-X500SG only*)**



Step 2 Setting up the remote commander

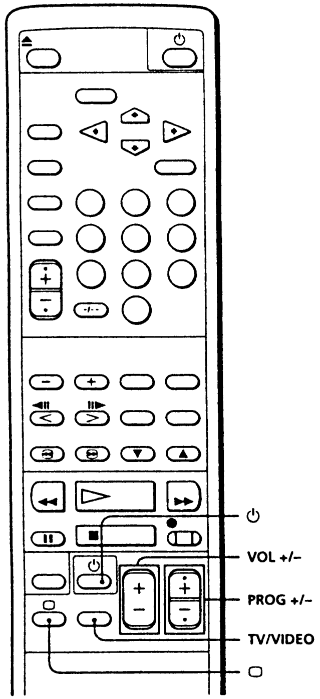
Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. To operate the VCR, point at the remote sensor on the VCR. To operate the TV, point at the remote sensor on the TV.

TV control buttons

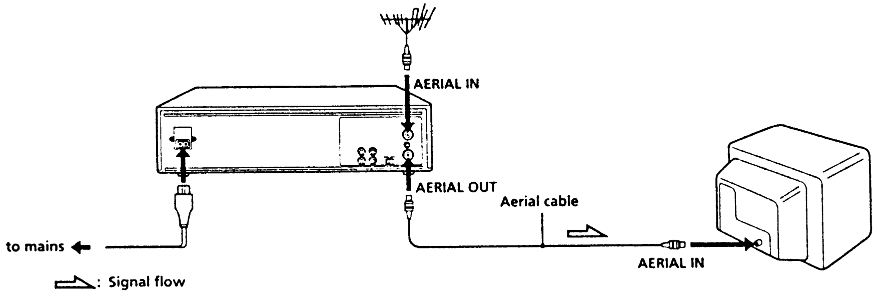


To	Press
Turn the TV into standby or active mode	⏻
Turn the power of the TV on	▢
Increase (+) or decrease (–) the volume of the TV	VOL +/–
Change the programme position of the TV	PROG +/–
Select an input source of the TV either from aerial in or from line in	TV/VIDEO

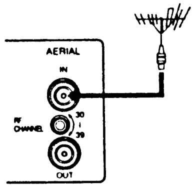
Notes

- With normal use, the batteries should last for approximately three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

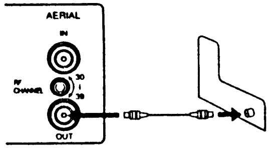
Step 3 Connecting the VCR



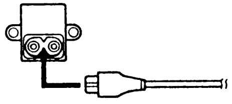
1 **Disconnect the aerial input cable from your TV and connect it to AERIAL IN of the VCR.**



2 **Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.**

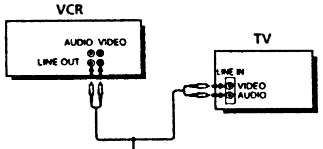


3 **Connect AC IN of the VCR and the mains supply using the mains lead.**
You've completed the basic hookup to watch and record TV programmes.



Additional connection

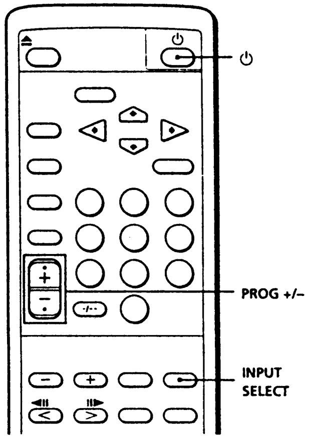
If your TV has phono type audio/video input jacks, this additional connection can improve picture quality. Connect to the TV as shown on the right.



Audio/video cable VMC-710M/720M (not supplied)

Step 4 Tuning the TV to your VCR

If you have connected the VCR to your TV using an audio/video cable, skip this step.



1

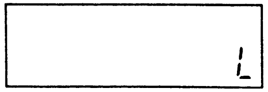
⏻

Press ⏻ (on/standby) to turn on the VCR.

2

INPUT SELECT

Press INPUT SELECT until "L" appears in the display window.



3

Turn on your TV and select a programme position for video playback. Choose a channel between UHF 30 and 39 on the TV, where there is no picture and no sound or only a steady rustling sound.

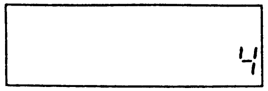
4

Tune the TV so that a clear blue screen appears on the TV screen.
Refer to your TV manual for tuning instructions.

5

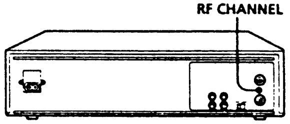
PROG

Press PROG +/– to check to see if the TV screen changes to a different programme.
You have now tuned your TV to the VCR. Whenever you play a tape, set the TV to the programme position selected in step **3** above.



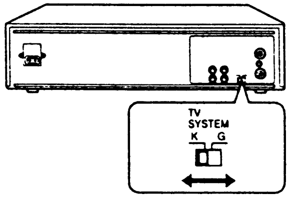
To obtain a clear blue screen

The blue screen may not appear clearly in step **4** above. In this case, turn the RF CHANNEL screw at the rear of the VCR with an RF screwdriver, to a position where the TV clearly displays a blue screen.



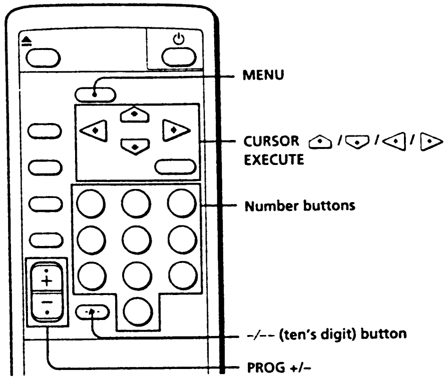
Selecting the TV system

For your TV to receive the correct signal from your VCR, you must set the TV SYSTEM switch at the rear of the VCR to either G (for system B/G) or K (for system D/K). If this switch is set to the wrong position, the sound is distorted.



Step 5 Tuning the VCR to TV channels

Now you can set your VCR to receive broadcast channels using the on-screen display.
If the TV is connected to the VCR using an audio/video cable, set the TV to video input.

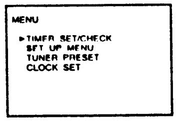


1 ⏻

Press ⏻ (on/standby) to turn on the VCR.

2 MENU

Press MENU.
The following menu appears on the TV screen.

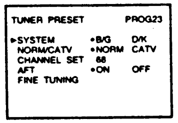


```
MENU

▶TIMER SET/CHECK
 SET UP MENU
 TUNER PRESET
 CLOCK SET
```

3 CURSOR EXECUTE

Press the △/▽ buttons to move the cursor (▶) to TUNER PRESET, then press EXECUTE.

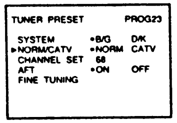


```
TUNER PRESET          PROG23

▶SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
 CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

4 CURSOR

Press the △/▽/◁/▷ buttons to move the cursor (▶) to NORM/CATV, then move the dot (•) to NORM.
To preset cable TV channels, move the dot (•) to CATV.

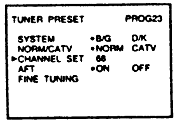


```
TUNER PRESET          PROG23

 SYSTEM        •B/G    D/K
▶NORM/CATV     •NORM   CATV
 CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

5 CURSOR

Press the △/▽ buttons to move the cursor (▶) to CHANNEL SET.

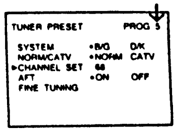


```
TUNER PRESET          PROG23

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

6 PROG + −

Press PROG +/- to select the programme position.

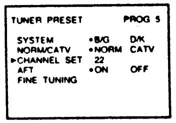


```
TUNER PRESET          PROG 5

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

7 ◁ CURSOR ▷

Press ▷ to start tuning.
The VCR starts searching for a channel and displays the first one it finds on the TV screen. Press the ◁/▷ buttons repeatedly until the channel you want is displayed.
The channels are scanned in the following order:



```
TUNER PRESET          PROG 5

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    22
 AFT           •ON     OFF
 FINE TUNING
```

(SLV-E400EE)

D/K TV system		**B/G TV system**	
Channel number in the CHANNEL SET field	**CHANNEL**	**Channel number in the CHANNEL SET field**	**CHANNEL**
2	R1	2	E2
5	R6	3	E3
6	R7	4	E4
12	R12	5	E5
13	R2	6	E6
14	R3	7	E7
15	R4	8	E8
16	R5	9	E9
17	R8	10	E10
18	R9	11	E11
19	R10	12	E12
20	R11	21-69	E21-E69
21-69	R21-R69	CATV 1-41	S1-S41
		CATV 42-46	S01-S05

(SLV-X500IS/X500SG)

Channel number in the CHANNEL SET field	**CHANNEL**
2-12	VHF 2-12
21-69	UHF 21-69
CATV 1-41	S1-41
CATV 42-46	S01-05

If you know the number of the channel you want, press the number buttons. For two-digit numbers, press the -/-- (ten's digit) button followed by the number buttons.

8 CURSOR

If the TV sound is distorted or noisy, press the △/▽/◁/▷ buttons to move the cursor (▶) to SYSTEM, then move the dot (•) to either B/G or D/K, whichever is applicable in your area.

9

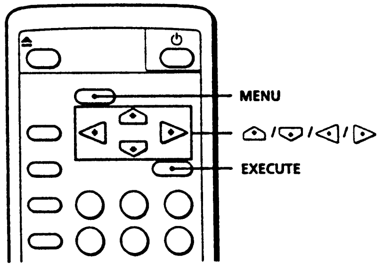
To allocate another channel to another programme position, repeat steps 6 and 7.

10 EXECUTE

Press EXECUTE to store all the allocated channels.

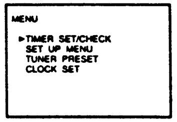
Step 6 Setting the clock

The last thing you need to do is set the date and clock.

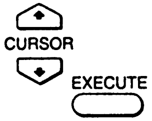


1

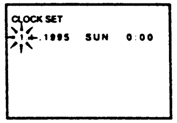
Press MENU.
The main MENU appears on the TV screen.


MENU
▶TIMER SET/CHECK
SET UP MENU
TUNER PRESET
CLOCK SET

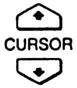
2



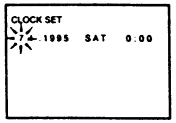
Press the △/▽ buttons to move the cursor (▶) to CLOCK SET, then press EXECUTE.
The CLOCK SET menu appears on the TV screen and the day flashes.


CLOCK SET
1 .1995 SUN 0:00

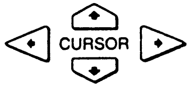
3



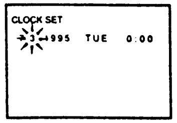
Set the day using the △/▽ buttons.
The day of the week is set automatically.


CLOCK SET
7 .1995 SAT 0:00

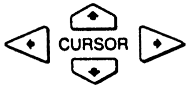
4



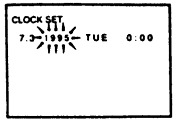
Press ▷ so that the month flashes and set the month using the △/▽ buttons.


CLOCK SET
3 .1995 TUE 0:00

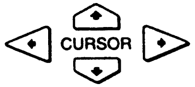
5



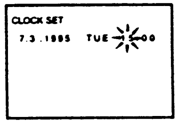
Press ▷ so that the year flashes and set the year using the △/▽ buttons.


CLOCK SET
7.3.1995 TUE 0:00

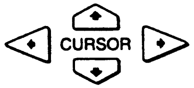
6



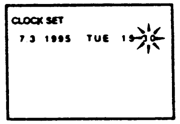
Press ▷ so that the hours flash and set the hours using the △/▽ buttons.


CLOCK SET
7.3.1995 TUE 0:00

7



Press ▷ so that the minutes flash and set the minutes using the △/▽ buttons.


CLOCK SET
7.3 1995 TUE 19:30

8

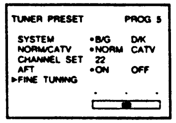
Press EXECUTE to start the clock.

Additional tuning instructions

If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture is not clear, you may also use the manual tuning function.

1 Press PROG +/– to select the programme number for which you cannot obtain a clear picture.
2 Press MENU, then select TUNER PRESET and press EXECUTE.
3 Select FINE TUNING. The fine tuning meter appears.



```
TUNER PRESET              PROG 5

 SYSTEM          •B/G    D/K
 NORM/CATV       •NORM   CATV
 CHANNEL SET      22
 AFT             •ON     OFF
▶FINE TUNING
```

4 Press the ◁ / ▷ buttons to get a clearer picture, then press EXECUTE. Note that the AFT (Auto Fine Tuning) setting switches to OFF.

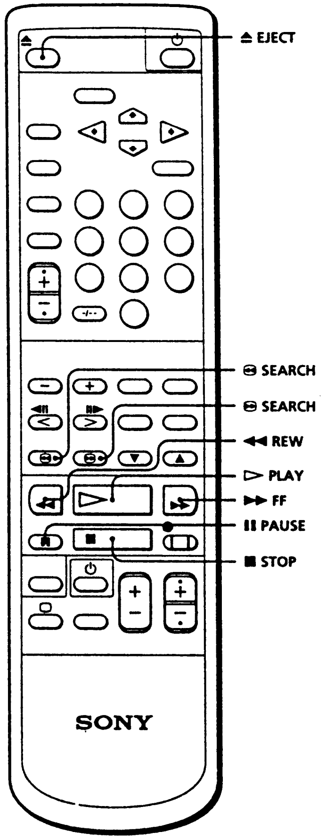
Disabling unwanted programme positions

After tuning the TV channels, you can disable unused programme positions. Positions that are disabled will be skipped later when you press the PROG +/– buttons.

1 Press MENU, then select TUNER PRESET and press EXECUTE.
2 Select CHANNEL SET.
3 Press PROG +/– until the programme position you want to disable appears beside PROG.
4 Press number button "0" twice to display the number "0" beside CHANNEL SET.
5 Repeat steps **3** and **4** for other positions you want to disable.
6 Press EXECUTE.

Basic Operations

Playing a tape



Tip

- For further information on searching and playback functions, see "Playing/searching at various speeds" on page **25**.

This section shows you how to play back a video tape.

1 Turn on your TV and tune in to the VCR:

- If the TV is connected to the VCR using an audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

2 Insert a tape.

The VCR turns on automatically. The tape starts playing automatically if its safety tab has been removed.

3 Press ▷ PLAY to start playing.

When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	❚❚ PAUSE
Resume play after pause	❚❚ PAUSE or ▷ PLAY
Fast-forward the tape	▶▶ FF during stop
Rewind the tape	◀◀ REW during stop
Search forward	▶▶ FF or ⊜ SEARCH during playback
Search backward	◀◀ REW or ⊜ SEARCH during playback
Eject the tape	⏏ EJECT

Playing a tape (continued)

To set the colour system

If streaks appear during playback, set the COLOR SYSTEM switch on the VCR to conform to the system that the tape was recorded in. (The normal setting is AUTO.)

When your tape was recorded in	Set COLOR SYSTEM to
PAL	PAL/MESECAM
NTSC	NTSC
MESECAM	PAL/MESECAM

To play an NTSC-recorded tape

Set the NTSC PB switch on the VCR according to the colour system of your TV.

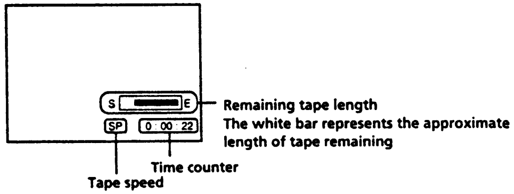
When your TV is	Set NTSC PB to
PAL	ON PAL TV
NTSC 4.43	NTSC 4.43

Note

- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
  - The picture becomes black and white.
  - The picture shakes.
  - No picture appears on the TV screen.
  - Black streaks appear horizontally on the TV screen.
  - The colour density increases or decreases.

Displaying the remaining tape length and time counter

Press DISPLAY to turn the display on or off.



The white bar represents the approximate length of tape remaining

Notes

- The display will not appear while playing an NTSC-recorded tape.
- The display will not appear during still mode or slow-motion playback.

Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to"0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

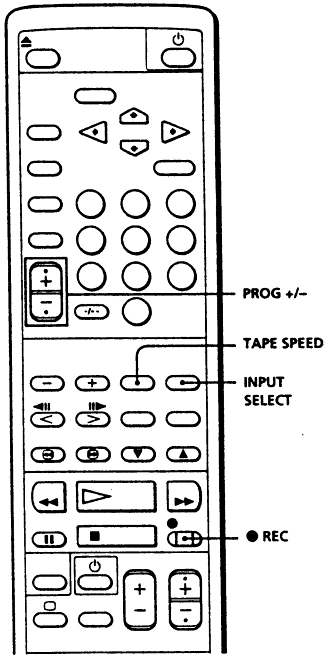
Notes

- When a tape is reinserted, the counter returns to "0H00M00S."
- The counter will not work on tape portions with no recording.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

Recording TV programmes

This section shows you how to record TV programmes in the most basic way: manual recording. With manual recording, you start the VCR recording when the programme begins, then stop it when the programme ends. The VCR also provides the following ways of recording:

- Manually start recording, then stop it automatically—"Recording using the quick timer" (page **18**)
- Automatically start and stop recording—"Recording TV programmes using the timer" (page **20**)



Note

- If you insert a tape with its safety tab removed, the VCR starts playing. To record on this tape, cover the tab hole.

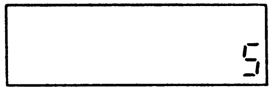
Tips

- To select programme positions, you can also use the number buttons on the remote commander. For two-digit numbers, press the -/-- (ten's digit) button followed by the number buttons.
- You can select a video source from the LINE IN jacks using PROG +/– or INPUT SELECT. When you use PROG +/–, "L" in the display window appears between the lowest programme position and the highest one.

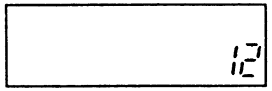
1 **Turn on your TV and tune in to the VCR:**
- If the TV is connected to the VCR using an audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

2 **Insert a tape with its safety tab in place.**

3 **Press PROG +/– until a programme position appears in the VCR's display window.**



4 **Select the desired programme position by pressing PROG +/–.**



5 **Select the tape speed, SP (standard play) or LP (long play), by pressing TAPE SPEED.**
See "To select tape speeds" on the next page.

6 **Start recording by pressing ● REC.**
When the tape reaches the end, the VCR automatically rewinds it to the beginning.

To stop recording

Press ■ STOP.

Recording TV programmes (continued)

Tips

- The display appears on the TV screen indicating information about the tape, but the information will not be recorded on the tape.
- If you do not want to watch TV while recording, you can turn off the TV.
- To cut out an unwanted scene while recording, press ❚❚ PAUSE, turn the DUAL MODE SHUTTLE ring on the VCR to rewind the tape to the beginning of the unwanted scene, then press ❚❚ PAUSE to resume recording.

Note

- If you have inserted a tape with its safety tab removed, the VCR ejects it when you press the ● REC button.

To select tape speeds

When recording, select either SP (standard play) or LP (long play). LP provides recording time twice as long as SP. However, SP provides better picture quality. You can mix SP and LP on the same tape. When playing back, the VCR automatically detects the tape speed. See the table below for the maximum recording/playback time in each speed.

Tape type	Maximum recording/playback time	
	SP	LP
E-300	5 hrs.	10 hrs.
E-240	4 hrs.	8 hrs.
E-180	3 hrs.	6 hrs.
E-120	2 hrs.	4 hrs.
E-60	1 hr.	2 hrs.

Recording using the quick timer

The quick timer enables you to record for a specified period of time in intervals of 30 minutes. Once you specify the recording time, the VCR automatically stops recording. Before you begin, check that the clock is set correctly.

Press QUICK TIMER until the desired duration appears in the display window. The TIMER REC indicator in the display window lights up. Each press increases the recording duration in increments of 30 minutes as shown below.

→ 0:00 → 0:30 → 1:00 ----→ 10:30 → 11:00 ↩

The recording duration decreases minute by minute to 0:00, then the VCR turns off automatically.

To stop recording

To stop quick-timer recording while the VCR is recording a programme, press ■ STOP.

To extend the recording duration while recording

Press QUICK TIMER until the desired duration appears in the display window.

Watching a TV programme while recording another

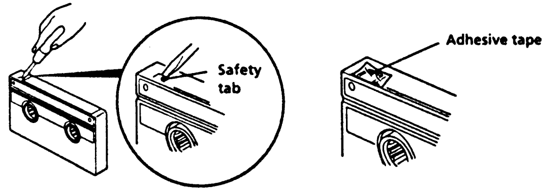
You can watch a TV programme and record another at the same time.

1. If the TV is connected to the VCR using an audio/video cable, set the TV to TV input. If the TV is connected to the VCR using only the aerial cable, skip this step.
2. Select the desired programme position on the TV.

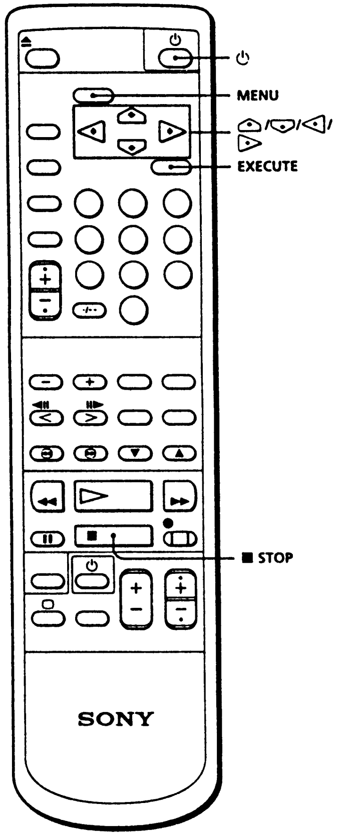
Saving a recording

Video tapes have a safety tab to protect against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with its safety tab removed ejects if you try to record on it.

To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.



Recording TV programmes using the timer

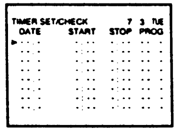

⏻
MENU
△/▽/◁/▷
EXECUTE
■ STOP
SONY

This section shows you how to let the VCR automatically start and stop recording TV programmes. You can preset up to eight programmes within a one month time frame.

Before you start...

- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR.

1 **Press MENU and select TIMER SET/CHECK.**
If the clock needs to be set, "PLEASE SET THE CLOCK" appears on the screen and the VCR automatically enters the clock setting mode.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG

Tips

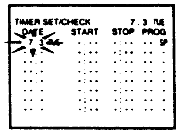
- To set the programme position, you can also use the PROG +/– or number buttons.
- To record a video source from the LINE IN jacks, keep pressing CURSOR (△/▽) or press INPUT SELECT to display "LINE" in the "PROG" position.

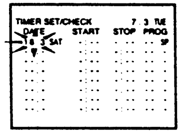
2 **Set the date to start recording:**

1 Press ▷.
Make sure today's date is flashing.
If it isn't, reset the clock to the correct time.

2 Press △ to set the date and month.
The day of the week is set automatically.

To record the same programme every day or the same day once a week, see "Daily/weekly recording" on page 22.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
7 3 TUE
SP


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT
SP

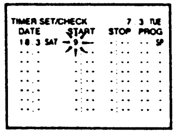
Tip

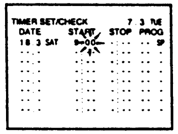
- To set the recording tape speed, you can also use TAPE SPEED.

3 **Set the time to start recording:**

1 Press ▷ to flash the hours under "START," then press the △/▽ buttons to set the hours.

2 Press ▷ to flash the minutes under "START," then press the △/▽ buttons to set the minutes.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT 9
SP


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT 9 00
SP

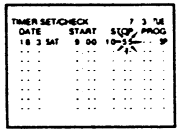
Tip

- To change or correct a setting before confirming it, press ◁ to flash the item you want to change and reset it.

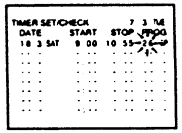
Notes

- If the ▣ tape indicator and the TIMER indicator in the VCR's display window flash when the VCR turns off, check for one of the following causes:
  - no cassette has been inserted,
  - the tape is at its end, or
  - the safety tab on the cassette has been removed.
- If the power is interrupted for more than three hours while standing by for recording, timer settings are cleared. Reset the settings from beginning.

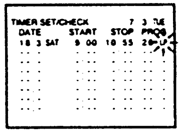
4 **Press ▷, then set the time to stop recording in the same way.**


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT 9 00 10 55
SP

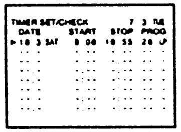
5 **Press ▷, then press the △/▽ buttons to select the programme position you want to record.**
Only the programme position preset in the VCR will appear.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT 9 00 10 55 2
SP

6 **Press ▷, then press the △/▽ buttons to select the tape speed, SP (standard play) or LP (long play).**
See "To select tape speeds" on page **18**.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
18 3 SAT 9 00 10 55 2 LP

7 **To confirm your programme, press ▷.**
All the settings stop flashing and the cursor (▶) appears in the leftmost column. To preset another timer setting, move the cursor to the next line using ▽ and repeat steps **2** to **7**.


TIMER SET/CHECK 7 3 TUE
DATE START STOP PROG
▶18 3 SAT 9 00 10 55 28 LP

8 **After making the desired timer settings, press EXECUTE, then press ⏻.**
The TIMER indicator in the display window lights up and the VCR turns off and stands by for recording.
The VCR automatically turns on and starts recording at the preset start time, and turns off at the preset stop time.

To stop recording

To stop while the VCR is recording a programme, press ■ STOP.

Recording TV programmes using the timer (continued)

To use the VCR while recording
You can do the following tasks during timer recording.

To	Press
Reset the counter to "0H00M00S"	COUNTER RESET
Display tape information on the TV screen	DISPLAY
Check the timer settings	MENU and select TIMER SET/CHECK
Watch another TV programme	See "Watching a TV programme while recording another" on page **19**.

Using the VCR before timer recording begins

Press ⏻ to turn off the TIMER indicator in the display window. The VCR is ready for use.

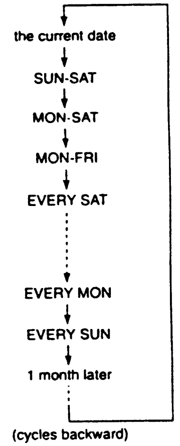
After using the VCR, press ⏻ again to turn on the TIMER indicator in the display window.
Remember to reset the VCR to stand by for recording before the time you've set the VCR to start recording, or the timer setting will be cancelled.

Daily/weekly recording

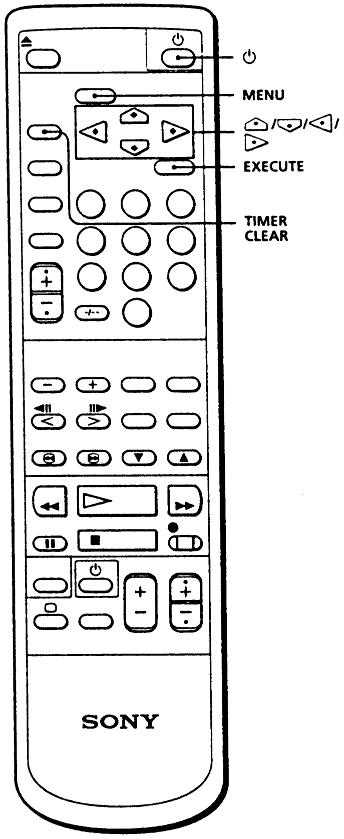
Daily recording records the same programme every day of the week; weekly recording records the same programme on the same day, every week.

When you set the date to start recording in step **2** of "Recording TV programmes using the timer," press ▽ until the desired day appears. Each time you press the button, the indication changes as shown on the left.

Daily/weekly recording



Checking/changing/cancelling timer settings

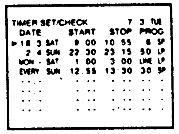


This section shows you how to check, change and cancel the timer settings after you've stored them in the VCR.

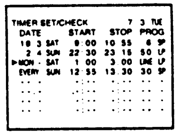
Before you start...
- Turn on your TV and tune in to the VCR.

1 **Press ⏻ to turn off the TIMER indicator in the display window.**

2 **Press MENU and select TIMER SET/CHECK.**



3 **Check the timer settings:**
- If you do not want to change or cancel the settings, press EXECUTE, then press ⏻ to return to recording standby.
- If you want to change or cancel the settings, press the △/▽ buttons to move the cursor (▶) to the setting you want to change or cancel.

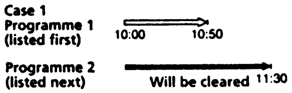


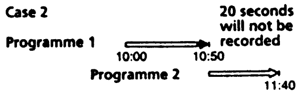
4 **Change or cancel the timer setting:**
- To change the setting, press the ◁/▷ buttons to flash the item you want to change, and reset it using the △/▽ buttons. Then, press ▷ repeatedly until the cursor appears in the leftmost column.
- To cancel the setting, press TIMER CLEAR.

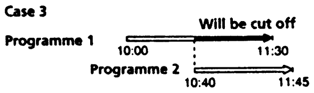
5 **Press EXECUTE.**
The VCR returns to the original screen. When there are any other timer settings left in the TIMER SET/CHECK menu, press ⏻ to return recording standby.

To check the timer settings during timer recording
Press MENU and select TIMER SET/CHECK. After checking, press EXECUTE to turn off the display.

Checking/changing/cancelling timer settings (continued)







When the timer settings overlap

The VCR will not record overlapping programmes. If any of your timer settings overlap, change the settings.

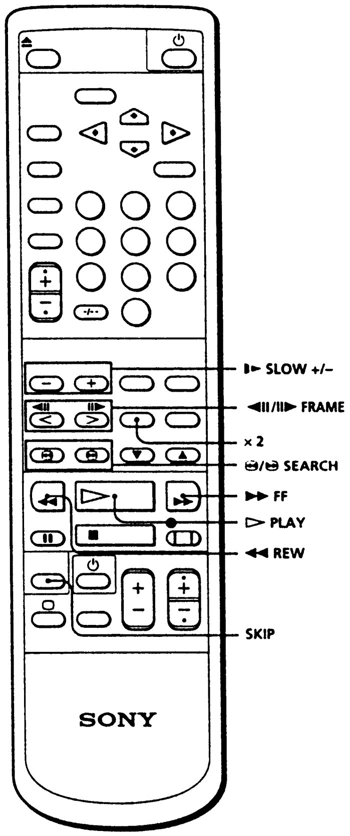
Case 1: ***If you preset two programmes to start recording at the same time...***
The programme listed first in the TIMER SET/CHECK menu has priority over the other programmes. The timer settings of lower priority programmes will be erased from the TIMER SET/CHECK menu when the first programme begins recording.

Case 2: ***If you preset programme 2 to start recording at the same time you preset programme 1 to finish recording...***
The last 20 seconds of programme 1 will not be recorded because the VCR will enter recording pause for programme 2 before programme 1 is finished.

Case 3: ***If you preset programme 2 to start recording before programme 1 is finished recording...***
Programme 2 will start recording before programme 1 has finished.

Additional Operations

Playing/searching at various speeds



Tip

- If the picture is shaking while in the still mode, adjust the picture with the ▼/▲ STILL ADJUST buttons.

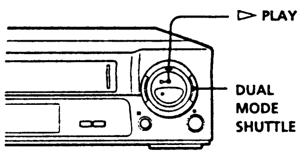
Note

- The colour of the picture may not be reproduced normally while playing back a tape at various speeds or pausing.

You can play back a tape at various speeds: high-speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback. The sound is muted during these operations.

Using the remote commander

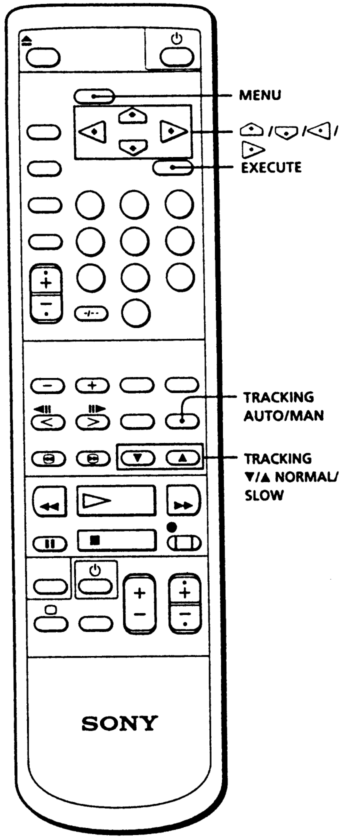
Playback options	**Operation**	**To resume normal playback**
Fast-forwarding/ Rewinding	During stop, press ▶▶ FF or ◀◀ REW.	Press ▷ PLAY.
Viewing the picture during fast-forward or rewind	During fast-forward, keep pressing ▶▶ FF. During rewind, keep pressing ◀◀ REW.	—
Playing at twice the normal speed	During playback or pause, press × 2.	Press ▷ PLAY.
Locking in a high-speed picture	During playback or pause, press ⊖ SEARCH or ⊖ SEARCH. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Locking in a slow-motion picture	During playback or pause, press I▶ SLOW+/–. You can increase the playback speed with the + button and decrease the speed with the – button. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Playing frame by frame	During pause, press II▶ FRAME to advance the picture one frame or ◀II FRAME to reverse the picture one frame. Keep pressing the button to advance or reverse one frame every one second.	Press ▷ PLAY.
Playing in reverse	During playback, press ◀II FRAME.	Press ▷PLAY.
Skipping a scene	During playback, press SKIP. Pressing once skips about 30 seconds.	The VCR automatically resumes normal playback.



Using the DUAL MODE SHUTTLE (DMS) ring on the VCR

Playback options	Operation	To resume normal playback
Playing at various speeds	During playback or pause, turn the DMS ring right or left.	Release the ring.
Fast-forwarding/ Rewinding	During stop, turn the DMS ring to ▶▶ FF or to ◀◀ REW and release.	Press ▷ PLAY.
Viewing the picture during fast-forward or rewind	During fast-forward, turn the DMS ring to ▶▶ FF. During rewind, turn the ring to ◀◀ REW.	—
Rewind and restart play	During stop, press ▷ PLAY on the VCR while holding the DMS ring at the ◀◀ REW position.	—

Adjusting the picture

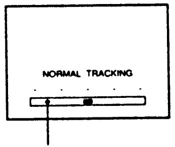


The VCR automatically adjusts the picture for the best possible playback or recording. If, however, you find the automatic adjustment unsatisfactory, you can adjust the picture manually.

Adjusting the tracking

Though the VCR automatically adjusts the tracking when playing a tape (the AUTO TRACKING indicator flashes in the display window, then lights steadily), distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking condition.

Press the ▼/▲ TRACKING NORMAL/SLOW buttons to display the tracking meter. The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press TRACKING AUTO/MAN to return to automatic adjustment.



Tracking meter

Reducing streaks and/or snow *(SLV-X500IS/X500SG only)*

If you are not satisfied with the picture quality while playing a tape, even if APC is on, press MENU and select SET UP MENU, then set RENTAL to ON according to your taste.

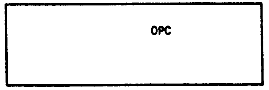
Adjusting the Picture
(continued)

About Adaptive Picture Control (APC) (*SLV-X500IS/X500SG*)/Optimum Picture Control (OPC) (*SLV-E400EE*)

Adaptive Picture Control (APC) or Optimum Picture Control (OPC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you leave APC/OPC ON on the SET UP MENU screen (with the APC/OPC indicator in the display window lit).

APC indicator (*SLV-X500IS/X500SG*)

OPC indicator (*SLV-E400EE*)



To use APC/OPC during playback
The APC/OPC function automatically works on all types of tapes, including rental tapes. You can play a tape using the APC/OPC function even if the tape was not recorded with it.

To use APC/OPC while recording
Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC/OPC function (the APC/OPC indicator flashes rapidly). This adjustment is retained until the tape is ejected. There is a short delay before the VCR actually starts recording while the VCR analyzes the tape.

If you want to start recording precisely the first time you record, set the VCR to recording pause mode (the APC/OPC indicator flashes slowly) and press ● REC to let the VCR analyze the tape. When the APC/OPC indicator stops flashing, press ❚❚ PAUSE to start recording. Recording begins immediately.

To deactivate the APC/OPC
Press MENU and select SET UP MENU, then set APC/OPC to OFF. The APC/OPC indicator in the display window goes off.

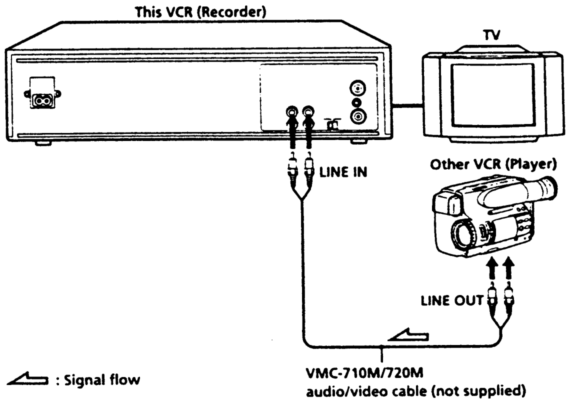
Tip
- We recommend you leave APC/OPC on even when recording on a tape played back on a VCR without the APC/OPC function.

Notes
- Tapes recorded using the APC/OPC function are played back normally on VCRs that do not have the APC/OPC function.
- Press ❚❚ PAUSE to start recording after the APC/OPC indicator stops flashing. If you start recording before the APC/OPC indicator stops flashing, the APC/OPC function is cancelled.

Editing with another VCR

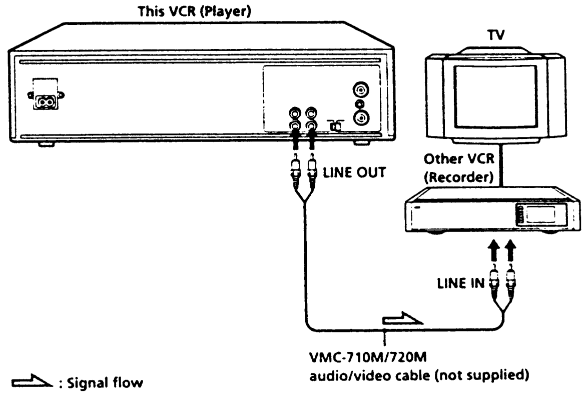
This section shows you how to edit to or from another VCR or camcorder. You can make a copy of a tape using this VCR for recording or playback.

How to hook up to record on this VCR



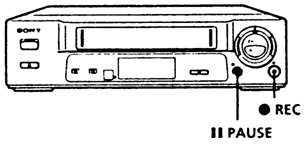
Tip
- Make sure you connect the plugs to jacks of the same colour.

How to hook up to record to another VCR



Note
- When connecting the VCRs, do not simultaneously connect the LINE IN and LINE OUT jacks on your VCR. A humming noise may occur if you do this.

Editing with another VCR *(continued)*


● REC
II PAUSE

Tips

- To release the VCRs from pause, use the **II** PAUSE buttons on the VCRs so that you can edit more precisely.
- To cut out unwanted scenes while editing, press **II** PAUSE on this VCR when an unwanted scene begins. When it ends, press **II** PAUSE again to resume recording (Assemble Editing).

Operation (when recording on this VCR)

Before you start editing

- Press INPUT SELECT to display "L" in the display window.
- Press TAPE SPEED to select the recording tape speed (SP or LP).

1 **Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

2 **Insert a tape into this (recording) VCR. Search for the point to start recording and press II PAUSE.**

3 **Press the ● REC button on this VCR and set it to recording pause.**

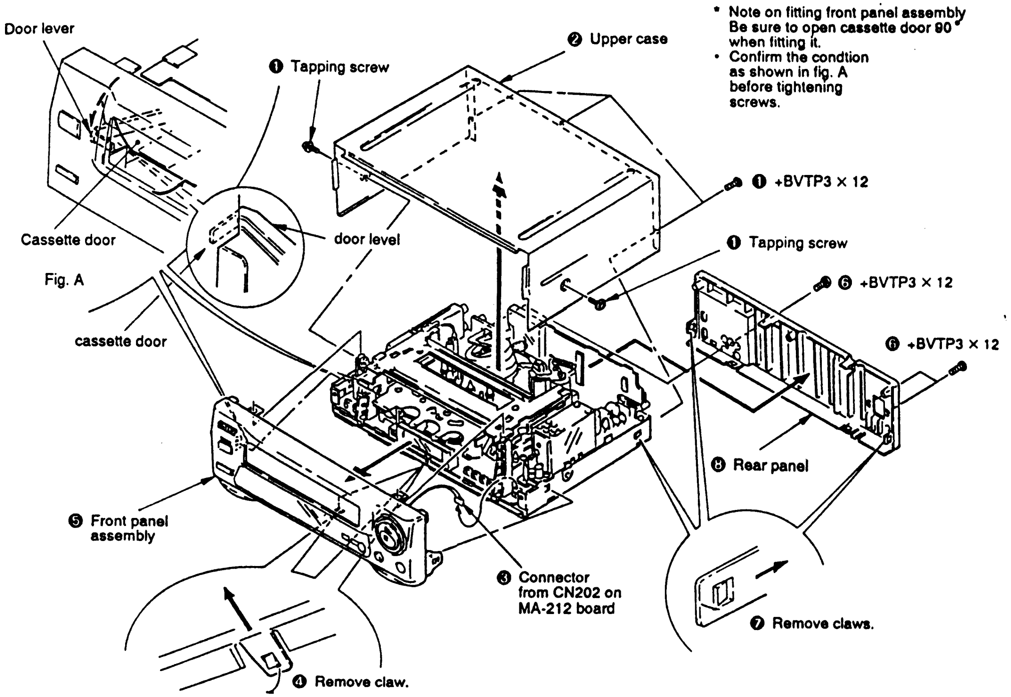
4 **To start editing, press the II PAUSE buttons on both VCRs to release the VCRs from pause.**
For best results, press the pause button on the other VCR just before pressing **II** PAUSE on this VCR.

To stop editing
Press the ■ STOP buttons on both VCRs.

SECTION 2
DISASSEMBLY

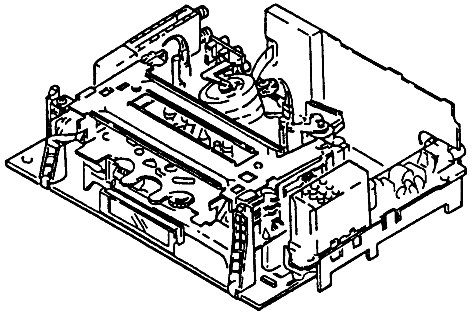
Note: Follow the disassembly procedure in the numerical order given.

2-1. FRONT PANEL ASSEMBLY AND CASE

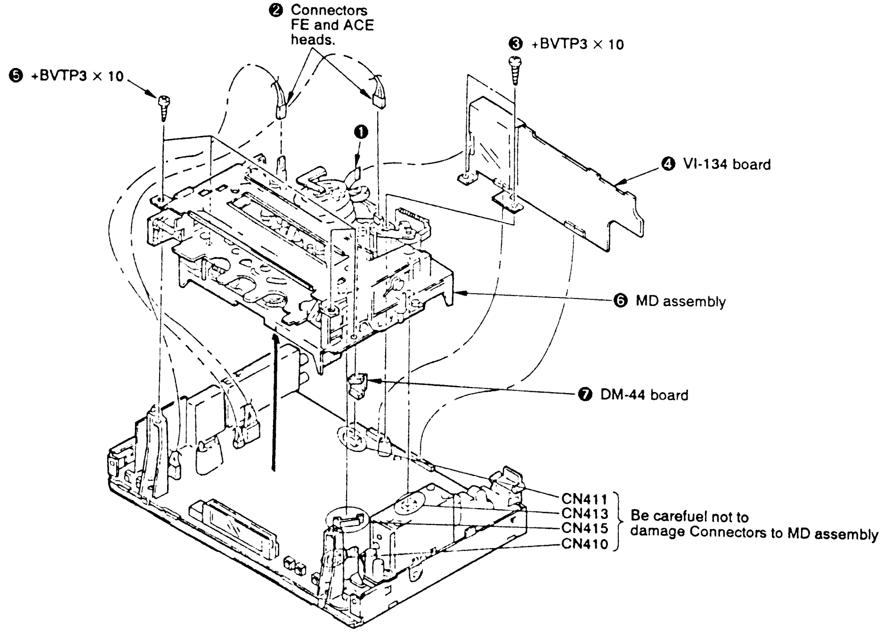

Door lever
❶ Tapping screw
❷ Upper case
❶ +BVTP3 × 12
❶ Tapping screw
❻ +BVTP3 × 12
❻ +BVTP3 × 12
Cassette door
door level
Fig. A
cassette door
❽ Rear panel
❺ Front panel assembly
❸ Connector from CN202 on MA-212 board
❼ Remove claws.
❹ Remove claw.

- Note on fitting front panel assembly
  Be sure to open cassette door 90°
  when fitting it.
- Confirm the condtion
  as shown in fig. A
  before tightening
  screws.

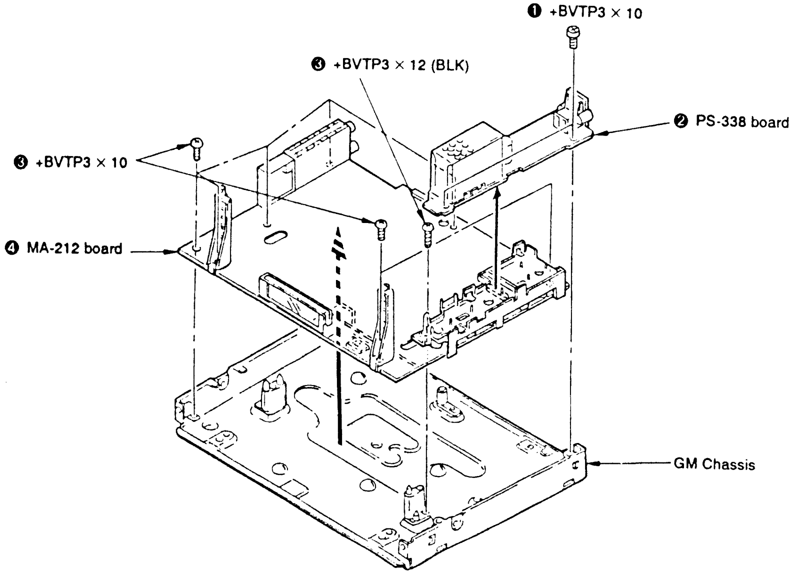
∗ On servicing, from above condition, GM chassis is removed,
  it is possible to check easily.



2-2. VI-134 AND DM-44 BOARDS AND MD ASSEMBLY

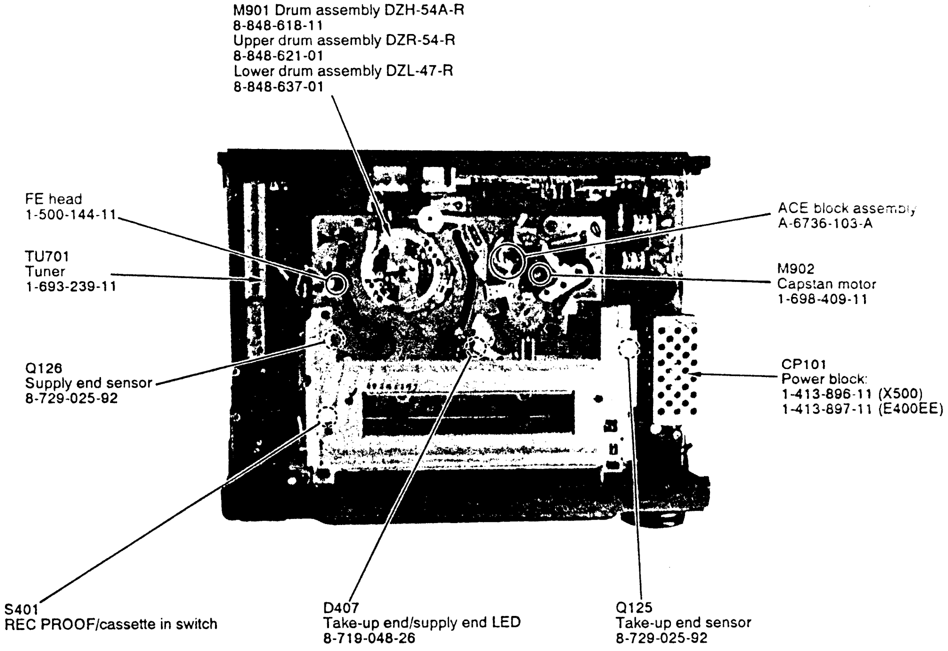

❷ Connectors FE and ACE heads.
❸ +BVTP3 × 10
❺ +BVTP3 × 10
❶
❹ VI-134 board
❻ MD assembly
❼ DM-44 board
CN411
CN413
CN415
CN410
Be carefuel not to damage Connectors to MD assembly

2-3. MA-212 AND PS-338 BOARDS

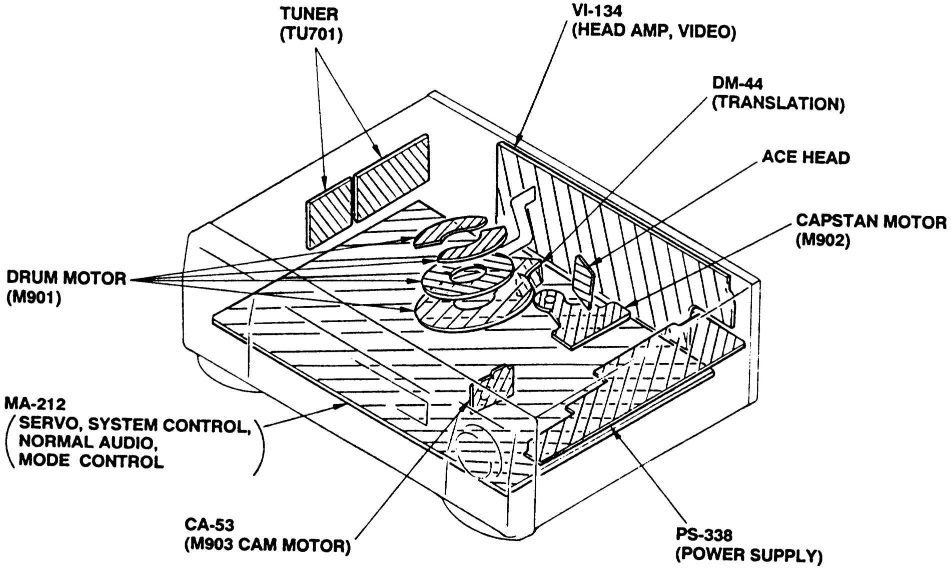

❶ +BVTP3 × 10
❸ +BVTP3 × 12 (BLK)
❷ PS-338 board
❸ +BVTP3 × 10
❹ MA-212 board
GM Chassis

2-4. INTERNAL VIEWS

– Top Side –


M901 Drum assembly DZH-54A-R
8-848-618-11
Upper drum assembly DZR-54-R
8-848-621-01
Lower drum assembly DZL-47-R
8-848-637-01
FE head
1-500-144-11
TU701
Tuner
1-693-239-11
Q126
Supply end sensor
8-729-025-92
ACE block assembly
A-6736-103-A
M902
Capstan motor
1-698-409-11
CP101
Power block:
1-413-896-11 (X500)
1-413-897-11 (E400EE)
S401
REC PROOF/cassette in switch
D407
Take-up end/supply end LED
8-719-048-26
Q125
Take-up end sensor
8-729-025-92

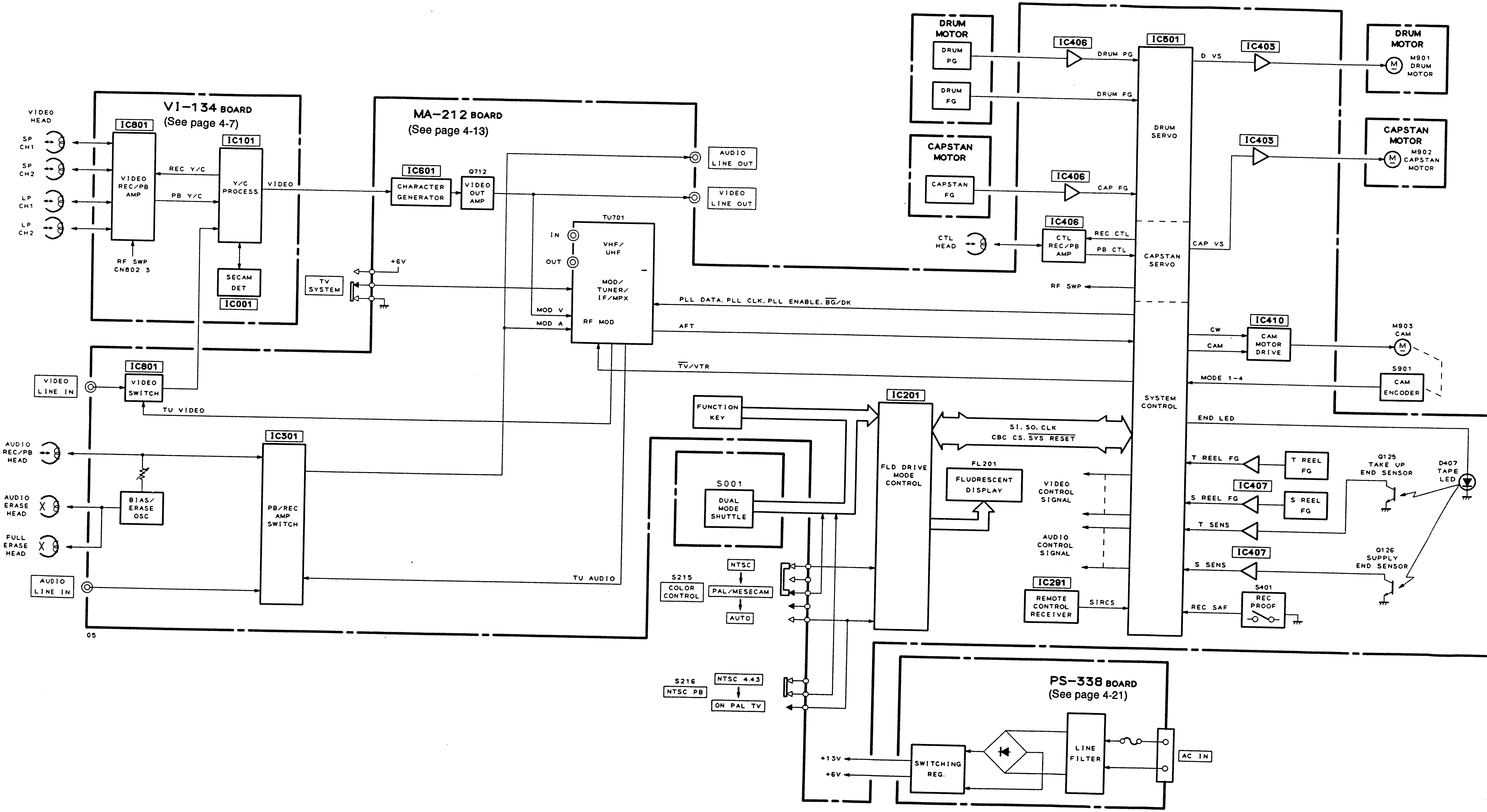
2-5. CIRCUIT BOARDS LOCATION


TUNER
(TU701)
VI-134
(HEAD AMP, VIDEO)
DM-44
(TRANSLATION)
ACE HEAD
CAPSTAN MOTOR
(M902)
DRUM MOTOR
(M901)
MA-212
(SERVO, SYSTEM CONTROL,
NORMAL AUDIO,
MODE CONTROL)
CA-53
(M903 CAM MOTOR)
PS-338
(POWER SUPPLY)

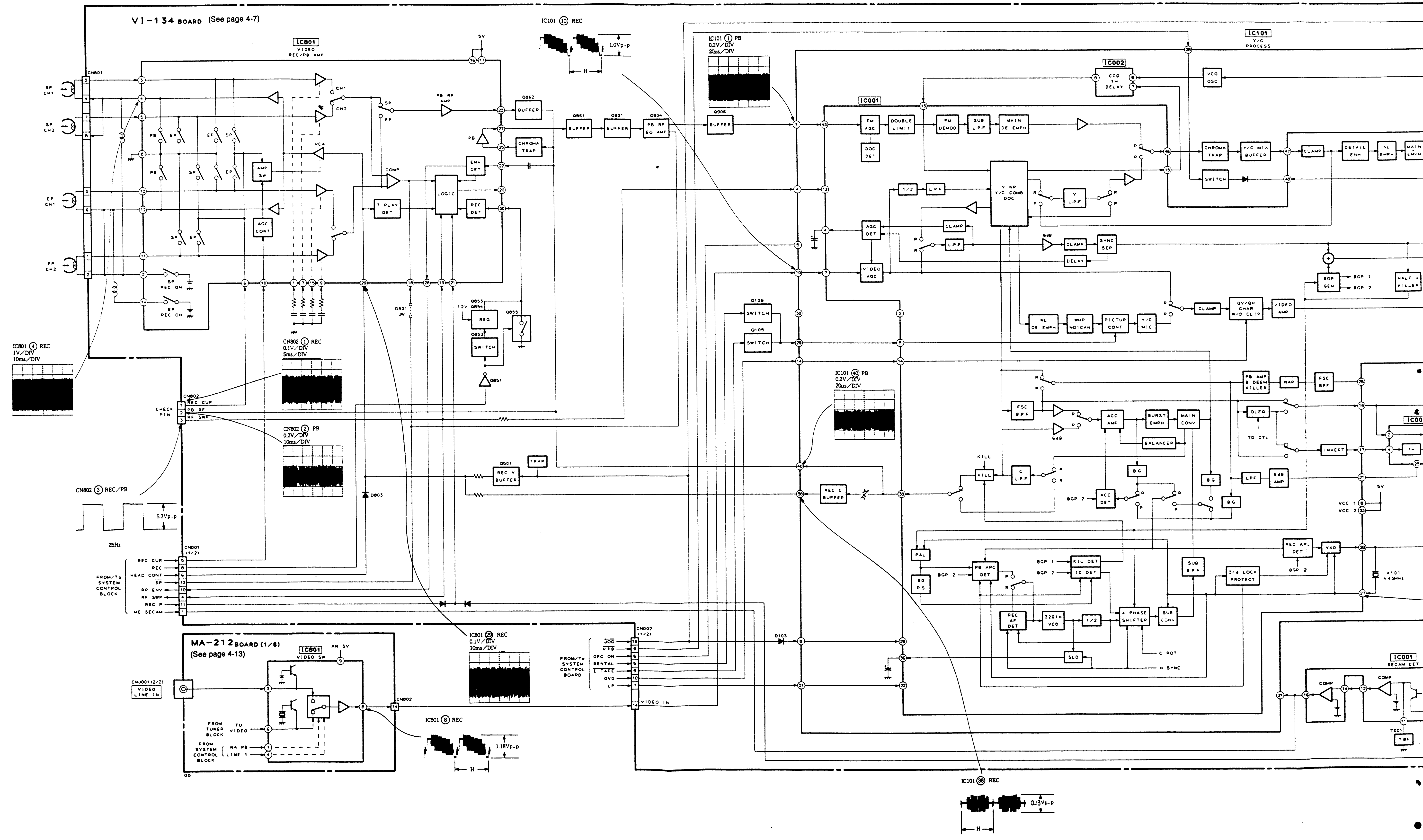
SECTION 3

BLOCK DIAGRAMS

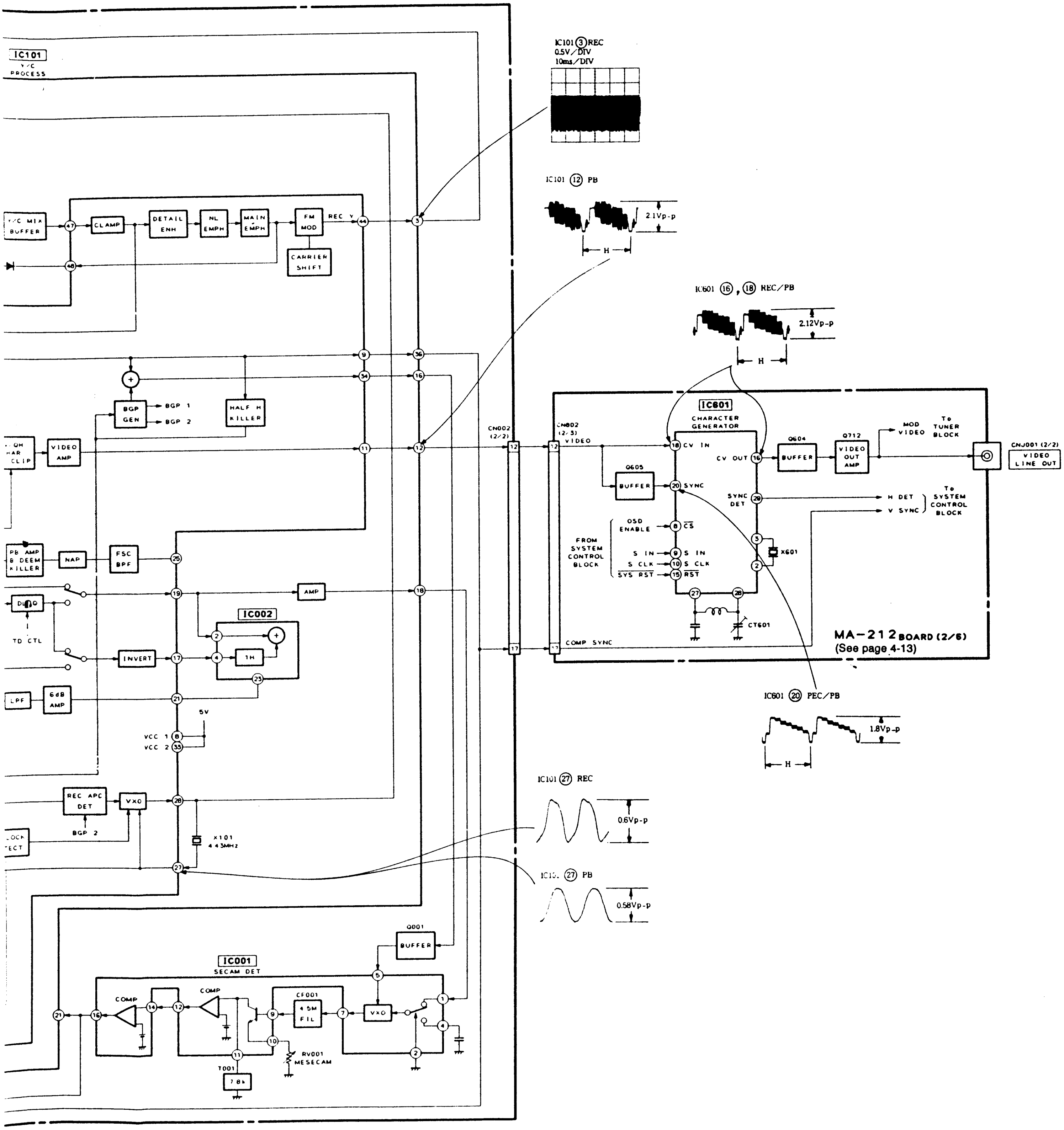
3-1. OVERALL BLOCK DIAGRAM


VI-134 BOARD
(See page 4-7)
VIDEO HEAD
SP CH1
SP CH2
LP CH1
LP CH2
IC801
VIDEO REC/PB AMP
RF SWP CN802 3
IC101
Y/C PROCESS
REC Y/C
PB Y/C
VIDEO
SECAM DET
IC001
IC801
VIDEO SWITCH
VIDEO LINE IN
TU VIDEO
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
BIAS/ ERASE OSC
IC301
PB/REC AMP SWITCH
AUDIO LINE IN
TU AUDIO
05
MA-212 BOARD
(See page 4-13)
IC601
CHARACTER GENERATOR
Q712
VIDEO OUT AMP
AUDIO LINE OUT
VIDEO LINE OUT
TV SYSTEM
+6V
TU701
IN
OUT
VHF/ UHF
MOD/ TUNER/ IF/MPX
RF MOD
MOD V
MOD A
PLL DATA, PLL CLK, PLL ENABLE, $\overline{BG}$/DK
AFT
$\overline{TV}$/VTR
FUNCTION KEY
S001
DUAL MODE SHUTTLE
S215
COLOR CONTROL
NTSC
PAL/MESECAM
AUTO
S216
NTSC PB
NTSC 4.43
ON PAL TV
IC201
FLD DRIVE MODE CONTROL
FL201
FLUORESCENT DISPLAY
SI, SO, CLK
CBC CS, $\overline{SYS\ RESET}$
VIDEO CONTROL SIGNAL
AUDIO CONTROL SIGNAL
IC291
REMOTE CONTROL RECEIVER
SIRCS
DRUM MOTOR
DRUM PG
DRUM FG
CAPSTAN MOTOR
CAPSTAN FG
IC406
DRUM PG
DRUM FG
IC406
CAP FG
CTL HEAD
IC406
CTL REC/PB AMP
REC CTL
PB CTL
RF SWP
IC501
DRUM SERVO
CAPSTAN SERVO
SYSTEM CONTROL
D VS
IC403
DRUM MOTOR
M901 DRUM MOTOR
IC403
CAPSTAN MOTOR
M902 CAPSTAN MOTOR
CAP VS
CW
CAM
IC410
CAM MOTOR DRIVE
M903 CAM
MODE 1-4
S901
CAM ENCODER
END LED
T REEL FG
T REEL FG
IC407
S REEL FG
S REEL FG
T SENS
IC407
S SENS
Q125 TAKE UP END SENSOR
D407 TAPE LED
Q126 SUPPLY END SENSOR
S401
REC PROOF
REC SAF
PS-338 BOARD
(See page 4-21)
+13V
+6V
SWITCHING REG.
LINE FILTER
AC IN

3-2. VIDEO BLOCK DIAGRAM

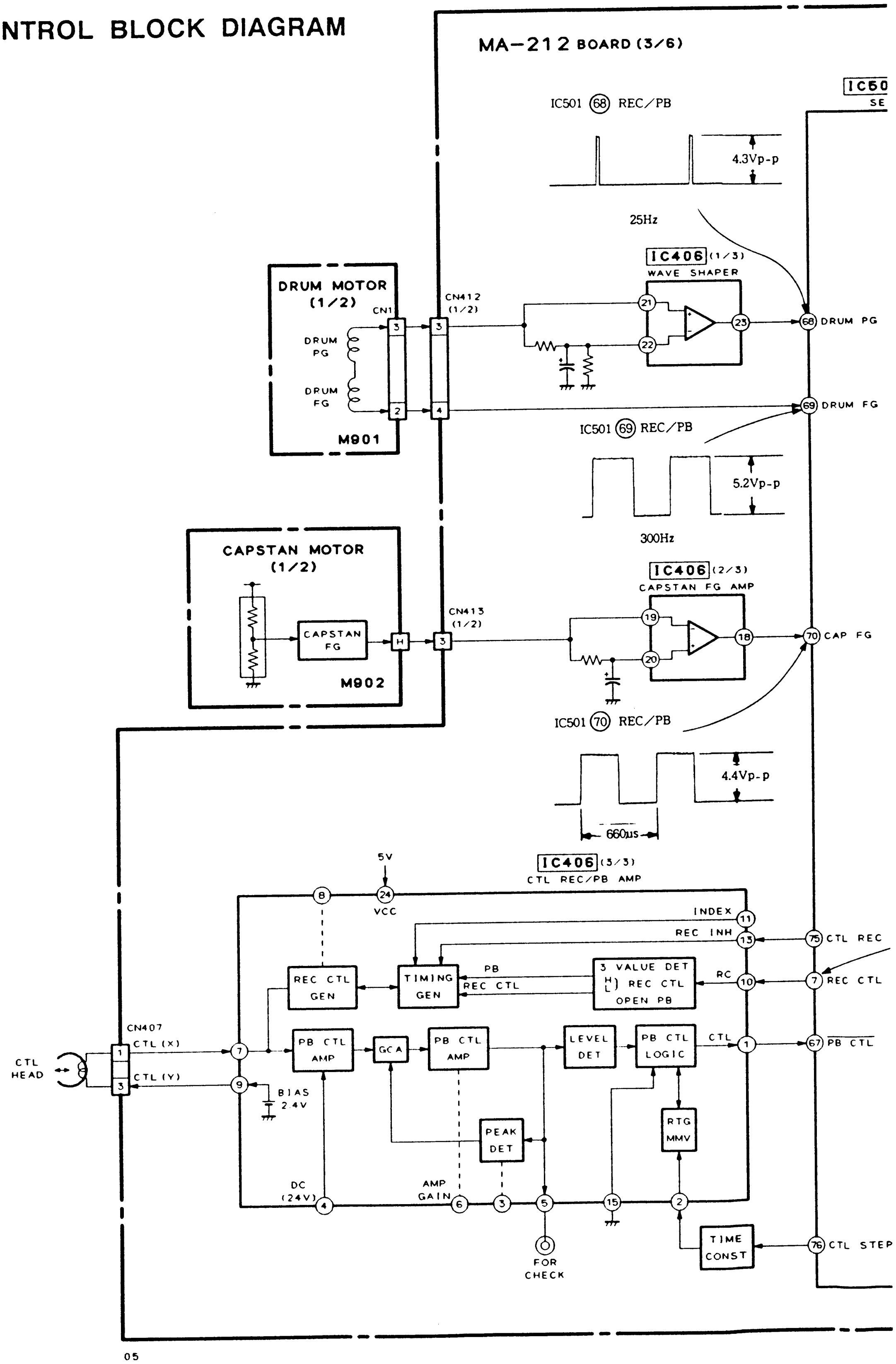

VI-134 BOARD (See page 4-7)
IC801
VIDEO REC/PB AMP
CN801
SP CH1
SP CH2
EP CH1
EP CH2
PB
EP
SP
AMP SW
AGC CONT
VCA
CH1
CH2
COMP
PB RF AMP
T PLAY DET
LOGIC
ENV DET
REC DET
Q862 BUFFER
CHROMA TRAP
SP REC ON
EP REC ON
5V
12V
Q853 Q854 REG
Q852 SWITCH
Q855
Q851
D801 JW
IC801 ④ REC
1V/DIV
10ms/DIV
CN802 ① REC
0.1V/DIV
5ms/DIV
CN802 ② PB
0.2V/DIV
10ms/DIV
CN802 ③ REC/PB
5.3Vp-p
25Hz
CHECK PIN
CN802
REC CUR
PB RF
RF SWP
Q501 REC Y BUFFER
TRAP
D803
CN001 (1/2)
FROM/To SYSTEM CONTROL BLOCK
REC CUR
REC
HEAD CONT
SP
RP ENV
RF SWP
REC P
ME SECAM
MA-212 BOARD (1/6)
(See page 4-13)
IC801 VIDEO SW
AN 5V
CNJ001 (2/2) VIDEO LINE IN
FROM TUNER BLOCK
TU VIDEO
FROM SYSTEM CONTROL BLOCK
NA PB
LINE 1
CN802
05
IC801 ⑧ REC
1.18Vp-p
H
IC801 ㉙ REC
0.1V/DIV
10ms/DIV
IC101 ⑩ REC
1.0Vp-p
H
Q861 BUFFER
Q901 BUFFER
Q904 PB RF EQ AMP
Q906 BUFFER
IC101 ① PB
0.2V/DIV
20us/DIV
Q106 SWITCH
Q105 SWITCH
IC101 ㊵ PB
0.2V/DIV
20us/DIV
REC C BUFFER
D103
CN002 (1/2)
FROM/To SYSTEM CONTROL BOARD
JOG
V.PB
ORC ON
RENTAL
E TAPE
QVD
LP
VIDEO IN
IC101 ㊳ REC
0.13Vp-p
H
IC001
FM AGC
DOC DET
DOUBLE LIMIT
FM DEMOD
SUB L.P.F
MAIN DE EMPH
1/2
L.P.F
Y NR Y/C COMB DOC
Y L.P.F
AGC DET
CLAMP
VIDEO AGC
6dB
SYNC SEP
DELAY
NL DE EMPH
WHP NOICAN
PICTUR CONT
Y/C MIC
IC002
CCD 1H DELAY
VCO OSC
IC101
Y/C PROCESS
CHROMA TRAP
Y/C MIX BUFFER
SWITCH
DETAIL ENH
NL EMPH
MAIN EMPH
BGP GEN
BGP 1
BGP 2
HALF H KILLER
QV/QH CHAR W/D CLIP
VIDEO AMP
PB AMP B DEEM KILLER
NAP
FSC BPF
FSC B.P.F
ACC AMP
BURST EMPH
MAIN CONV
BALANCER
DLEQ
TD CTL
INVERT
1H
KILL
C L.P.F
B G
ACC DET
LPF
6dB AMP
5V
VCC 1
VCC 2
PAL
90 PS
PB APC DET
KIL DET
ID DET
REC APC DET
VXO
SUB B.P.F
3rd LOCK PROTECT
X101 4.43MHz
REC AF DET
320fH VCO
4 PHASE SHIFTER
SUB CONV
SLD
C ROT
H SYNC
IC001
SECAM DET
COMP
T001
78k

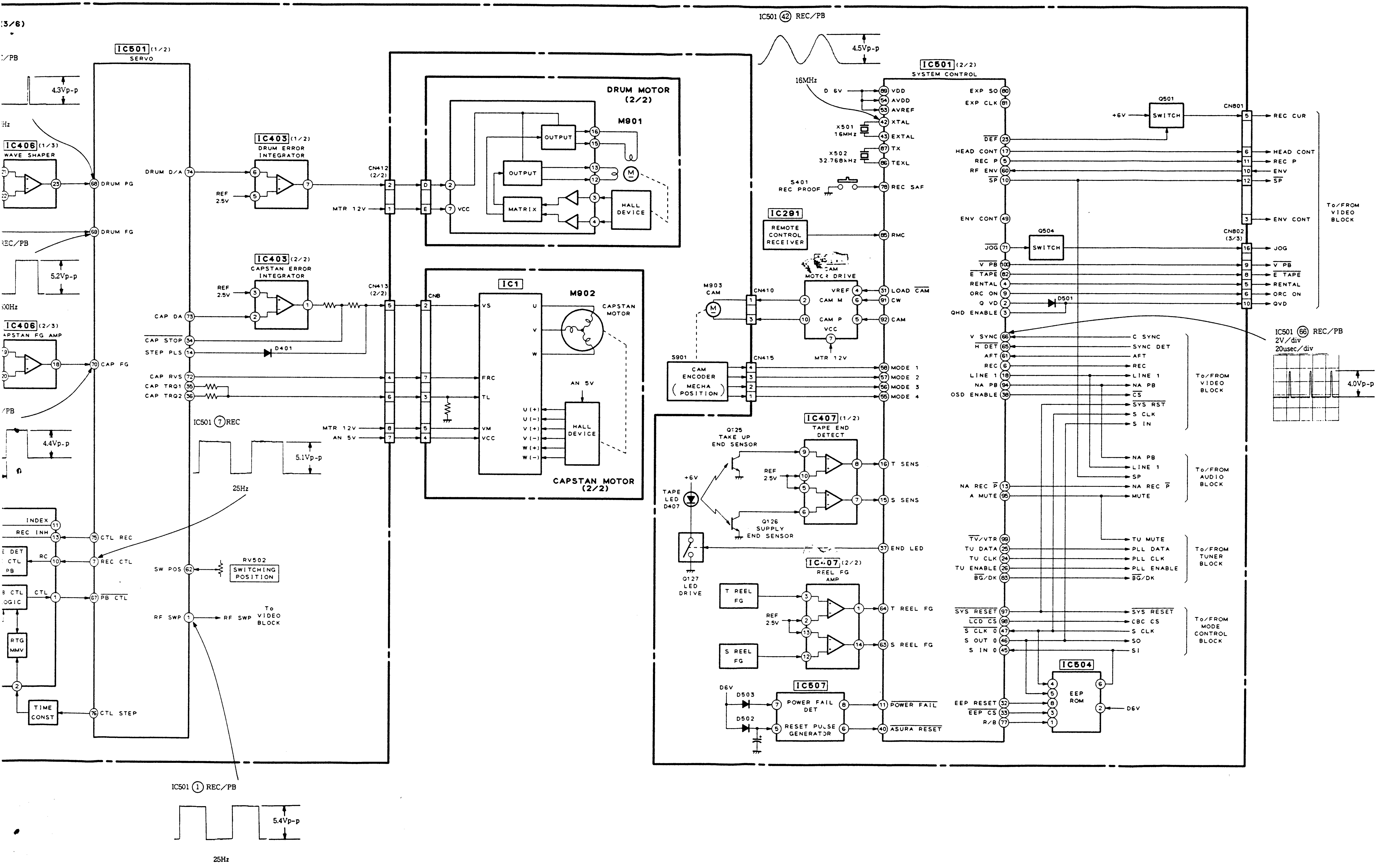
4-1 136


IC101
Y/C PROCESS
Y/C MIX BUFFER
CLAMP
DETAIL ENH
NL EMPH
MAIN EMPH
FM MOD
REC Y
CARRIER SHIFT
BGP GEN
BGP 1
BGP 2
HALF H KILLER
CHAR CLIP
VIDEO AMP
PB AMP & DEEM KILLER
NAP
FSC BPF
TD CTL
INVERT
AMP
IC002
1H
LPF
6dB AMP
5V
VCC 1
VCC 2
REC APC DET
VXO
LOCK DETECT
X101
4.43MHz
Q001
BUFFER
IC001
SECAM DET
COMP
COMP
CF001
4.5M FIL
VXO
T001
7.8k
RV001
MESECAM
CN002 (2/2)
CN802 (2/3)
VIDEO
COMP SYNC
IC601
CHARACTER GENERATOR
CV IN
CV OUT
SYNC
SYNC DET
CS
S IN
S CLK
RST
OSD ENABLE
FROM SYSTEM CONTROL BLOCK
S IN
S CLK
SYS RST
Q605
BUFFER
Q604
BUFFER
Q712
VIDEO OUT AMP
MOD VIDEO
To TUNER BLOCK
H DET
V SYNC
To SYSTEM CONTROL BLOCK
X601
CT601
CNJ001 (2/2)
VIDEO LINE OUT
IC101 ③ REC
0.5V/DIV
10ms/DIV
IC101 ⑫ PB
2.1Vp-p
H
IC601 ⑯, ⑱ REC/PB
2.12Vp-p
H
IC601 ⑳ PEC/PB
1.8Vp-p
H
IC101 ㉗ REC
0.6Vp-p
IC101 ㉗ PB
0.58Vp-p

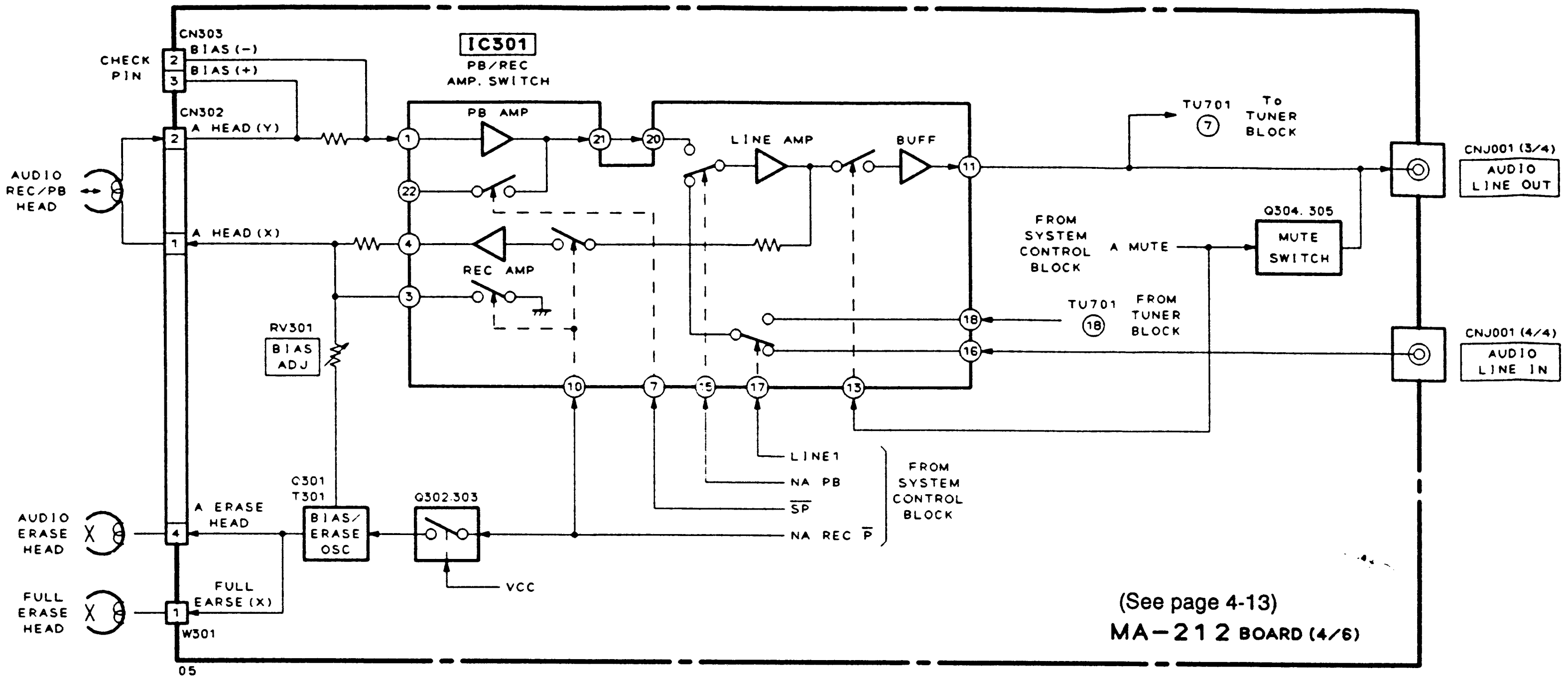
MA-212 BOARD (2/6)
(See page 4-13)

3-3. SERVO, SYSTEM CONTROL BLOCK DIAGRAM

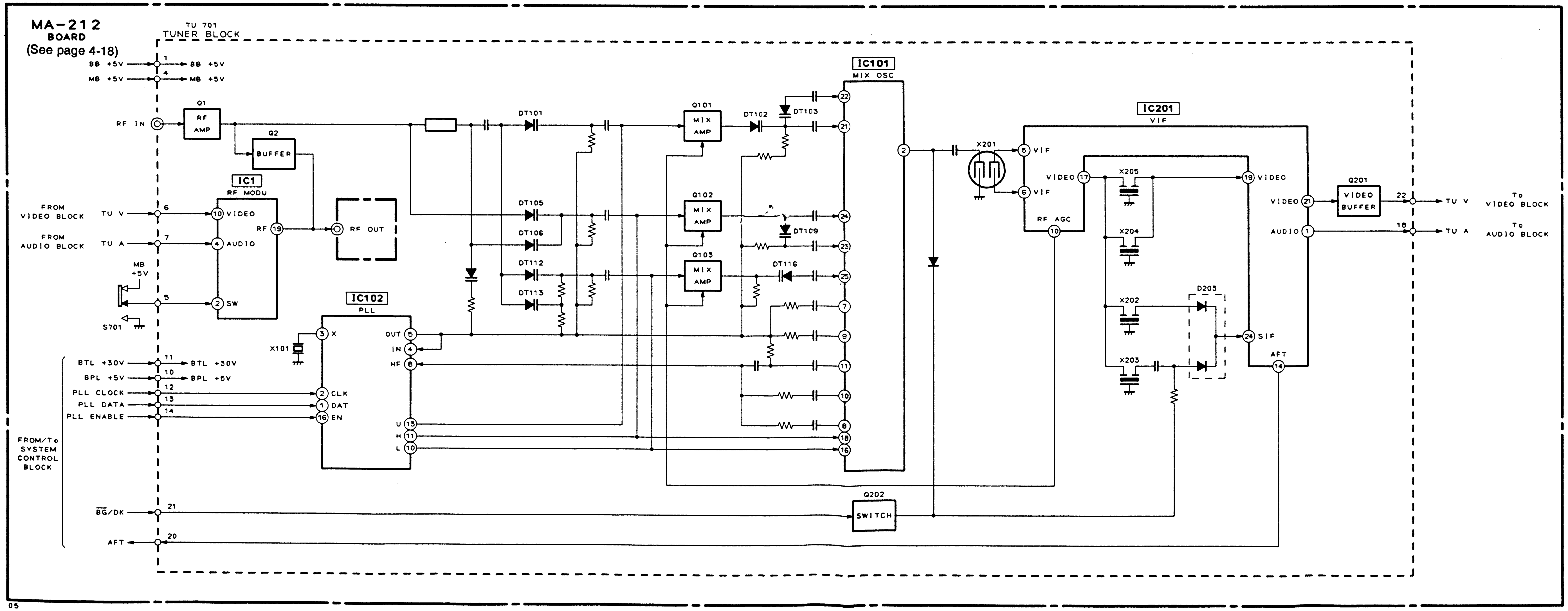

MA-212 BOARD (3/6)
IC50
SE
IC501 (68) REC/PB
4.3Vp-p
25Hz
IC406 (1/3)
WAVE SHAPER
DRUM MOTOR
(1/2)
CN1
DRUM PG
DRUM FG
M901
CN412
(1/2)
3
4
2
21
22
23
68 DRUM PG
69 DRUM FG
IC501 (69) REC/PB
5.2Vp-p
300Hz
IC406 (2/3)
CAPSTAN FG AMP
CAPSTAN MOTOR
(1/2)
CAPSTAN FG
H
M902
CN413
(1/2)
19
20
18
70 CAP FG
IC501 (70) REC/PB
4.4Vp-p
660μs
5V
IC406 (3/3)
CTL REC/PB AMP
8
24
VCC
INDEX
11
REC INH
13
75 CTL REC
REC CTL GEN
TIMING GEN
PB
REC CTL
3 VALUE DET
H L) REC CTL
OPEN PB
RC
10
7 REC CTL
CN407
CTL (X)
CTL (Y)
CTL HEAD
1
3
7
9
BIAS
2.4V
PB CTL AMP
GCA
PB CTL AMP
LEVEL DET
PB CTL LOGIC
CTL
1
67 PB CTL
PEAK DET
RTG MMV
DC
(24V)
4
AMP GAIN
6
3
5
15
2
FOR CHECK
TIME CONST
76 CTL STEP
05


(3/6)
IC501 (1/2) SERVO
4.3Vp-p
IC406 (1/3) WAVE SHAPER
DRUM PG
DRUM FG
5.2Vp-p
IC406 (2/3) CAPSTAN FG AMP
CAP FG
4.4Vp-p
INDEX
REC INH
CTL REC
REC CTL
RC
CTL
PB CTL
RTG MMV
TIME CONST
CTL STEP
DRUM D/A
IC403 (1/2) DRUM ERROR INTEGRATOR
REF 2.5V
MTR 12V
IC403 (2/2) CAPSTAN ERROR INTEGRATOR
CAP DA
CAP STOP
STEP PLS
D401
CAP RVS
CAP TRQ1
CAP TRQ2
IC501 ⑦ REC
5.1Vp-p
25Hz
MTR 12V
AN 5V
SW POS
RV502 SWITCHING POSITION
RF SWP
RF SWP
To VIDEO BLOCK
IC501 ① REC/PB
5.4Vp-p
25Hz
CN412 (2/2)
CN413 (2/2)
CN8
DRUM MOTOR (2/2)
M901
OUTPUT
OUTPUT
MATRIX
HALL DEVICE
VCC
IC1
M902
CAPSTAN MOTOR
VS
FRC
TL
VM
VCC
U V W
U(+) U(-) V(+) V(-) W(+) W(-)
AN 5V
HALL DEVICE
CAPSTAN MOTOR (2/2)
IC501 ㊷ REC/PB
4.5Vp-p
16MHz
IC501 (2/2) SYSTEM CONTROL
D 6V
VDD
AVDD
AVREF
XTAL
EXTAL
TX
TEXL
X501 16MHz
X502 32.768kHz
S401 REC PROOF
REC SAF
IC291 REMOTE CONTROL RECEIVER
RMC
CAM MOTOR DRIVE
VREF
CAM M
CAM P
VCC
MTR 12V
LOAD CAM
CW
CAM
M903 CAM
CN410
CN415
S901 CAM ENCODER (MECHA POSITION)
MODE 1
MODE 2
MODE 3
MODE 4
IC407 (1/2) TAPE END DETECT
Q125 TAKE UP END SENSOR
+6V
TAPE LED D407
REF 2.5V
Q126 SUPPLY END SENSOR
T SENS
S SENS
Q127 LED DRIVE
END LED
IC407 (2/2) REEL FG AMP
T REEL FG
S REEL FG
REF 2.5V
T REEL FG
S REEL FG
D6V
D503
D502
IC507
POWER FAIL DET
RESET PULSE GENERATOR
POWER FAIL
ASURA RESET
EXP SO
EXP CLK
DEF
HEAD CONT
REC P
RF ENV
SP
ENV CONT
JOG
V PB
E TAPE
RENTAL
ORC ON
Q VD
QHD ENABLE
D501
Q501 SWITCH
+6V
Q504 SWITCH
CN801
CN802 (3/3)
REC CUR
HEAD CONT
REC P
ENV
SP
ENV CONT
JOG
V PB
E TAPE
RENTAL
ORC ON
QVD
To/FROM VIDEO BLOCK
IC501 ⑯ REC/PB
2V/div
20usec/div
4.0Vp-p
V SYNC
H DET
AFT
REC
LINE 1
NA PB
OSD ENABLE
C SYNC
SYNC DET
AFT
REC
LINE 1
NA PB
CS
SYS RST
S CLK
S IN
To/FROM VIDEO BLOCK
NA REC P
A MUTE
NA PB
LINE 1
SP
NA REC P
MUTE
To/FROM AUDIO BLOCK
TV/VTR
TU DATA
TU CLK
TU ENABLE
BG/DK
TU MUTE
PLL DATA
PLL CLK
PLL ENABLE
BG/DK
To/FROM TUNER BLOCK
SYS RESET
LCD CS
S CLK O
S OUT O
S IN O
SYS RESET
CBC CS
S CLK
SO
SI
To/FROM MODE CONTROL BLOCK
IC504 EEP ROM
EEP RESET
EEP CS
R/B
D6V

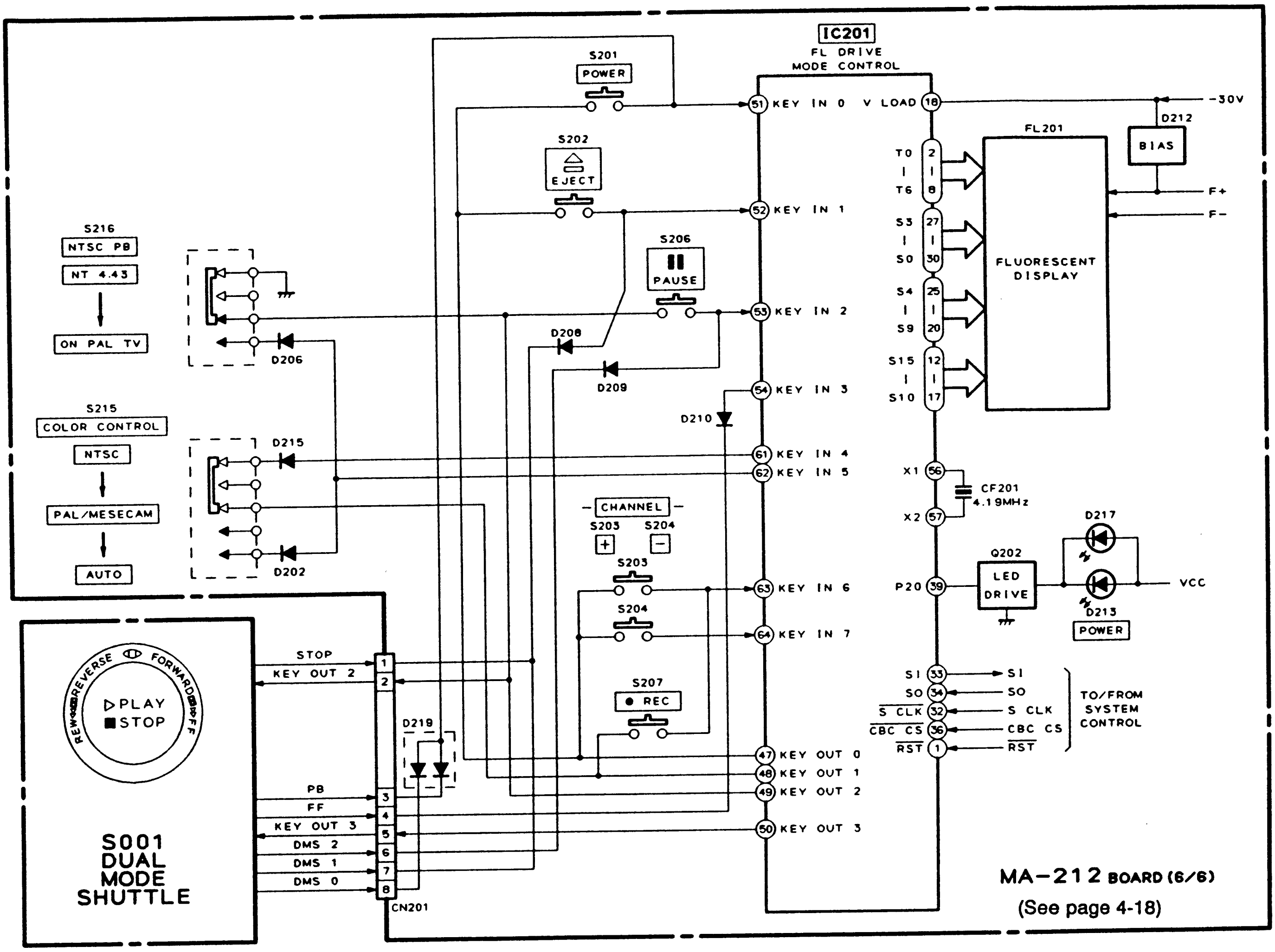
3-4. AUDIO BLOCK DIAGRAM


CN303
BIAS (−)
BIAS (+)
CHECK PIN
2
3
IC301
PB/REC AMP. SWITCH
CN302
A HEAD (Y)
PB AMP
AUDIO REC/PB HEAD
A HEAD (X)
REC AMP
LINE AMP
BUFF
TU701 ⑦ To TUNER BLOCK
CNJ001 (3/4)
AUDIO LINE OUT
FROM SYSTEM CONTROL BLOCK
A MUTE
Q304, 305
MUTE SWITCH
TU701 ⑱ FROM TUNER BLOCK
CNJ001 (4/4)
AUDIO LINE IN
RV301
BIAS ADJ
LINE1
NA PB
SP
NA REC P
FROM SYSTEM CONTROL BLOCK
Q301
T301
A ERASE HEAD
BIAS/ERASE OSC
Q302.303
VCC
AUDIO ERASE HEAD
FULL ERASE HEAD
FULL EARSE (X)
W301
05
(See page 4-13)
MA−212 BOARD (4/6)

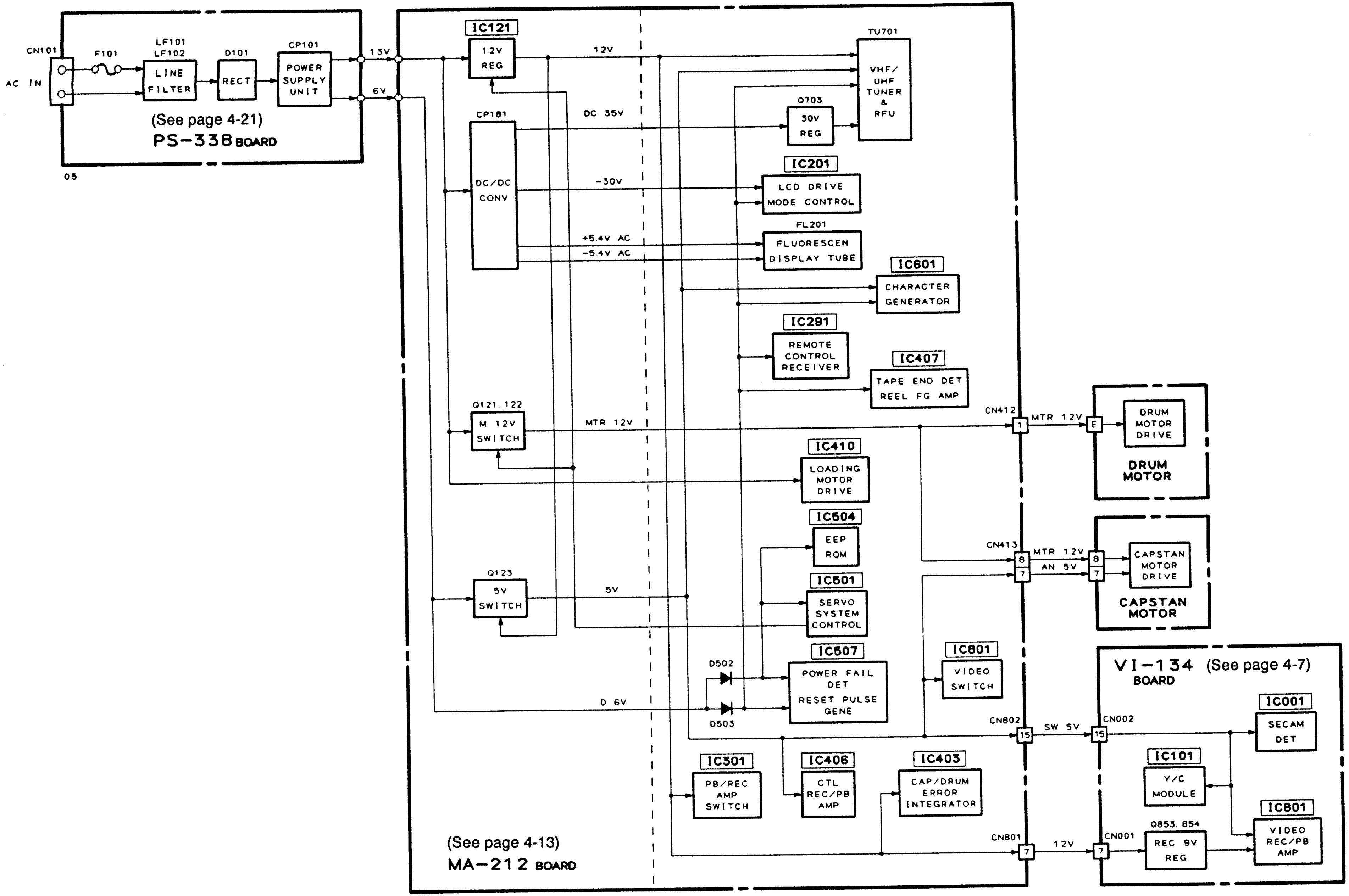
3-5. TUNER BLOCK DIAGRAM


MA−212 BOARD
(See page 4-18)
TU 701
TUNER BLOCK
BB +5V
MB +5V
RF IN
Q1
RF AMP
Q2
BUFFER
IC1
RF MODU
FROM VIDEO BLOCK
TU V
VIDEO
FROM AUDIO BLOCK
TU A
AUDIO
RF
RF OUT
MB +5V
SW
S701
IC102
PLL
X101
X
OUT
IN
HF
CLK
DAT
EN
U
H
L
BTL +30V
BPL +5V
PLL CLOCK
PLL DATA
PLL ENABLE
FROM/To SYSTEM CONTROL BLOCK
BG/DK
AFT
DT101
DT105
DT106
DT112
DT113
Q101
Q102
Q103
MIX AMP
DT102
DT103
DT109
DT116
IC101
MIX OSC
X201
IC201
VIF
VIF
VIDEO
X205
X204
X202
X203
D203
RF AGC
SIF
AFT
Q201
VIDEO BUFFER
AUDIO
TU V To VIDEO BLOCK
TU A To AUDIO BLOCK
Q202
SWITCH
05

3-6. MODE CONTROL BLOCK DIAGRAM


IC201
FL DRIVE
MODE CONTROL
S201
POWER
S202
EJECT
S206
PAUSE
S216
NTSC PB
NT 4.43
ON PAL TV
D206
D208
D209
D210
S215
COLOR CONTROL
NTSC
PAL/MESECAM
AUTO
D215
D202
CHANNEL
S203
S204
+
−
S205
S204
S207
● REC
D219
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
KEY IN 4
KEY IN 5
KEY IN 6
KEY IN 7
KEY OUT 0
KEY OUT 1
KEY OUT 2
KEY OUT 3
V LOAD
T0
T6
S3
S0
S4
S9
S15
S10
X1
X2
CF201
4.19MHz
P20
Q202
LED DRIVE
D217
D213
POWER
VCC
SI
SO
S CLK
CBC CS
RST
TO/FROM SYSTEM CONTROL
FL201
FLUORESCENT DISPLAY
D212
BIAS
−30V
F+
F−
STOP
KEY OUT 2
PB
FF
KEY OUT 3
DMS 2
DMS 1
DMS 0
CN201
REVERSE
FORWARD
REW
FF
▷PLAY
■STOP
S001
DUAL
MODE
SHUTTLE
MA−212 BOARD (6/6)
(See page 4-18)
05

3-7. POWER SUPPLY BLOCK DIAGRAM


AC IN
CN101
F101
LF101
LF102
LINE FILTER
D101
RECT
CP101
POWER SUPPLY UNIT
(See page 4-21)
PS-338 BOARD
05
13V
6V
IC121
12V REG
12V
CP181
DC/DC CONV
DC 35V
-30V
+5.4V AC
-5.4V AC
TU701
VHF/UHF TUNER & RFU
Q703
30V REG
IC201
LCD DRIVE MODE CONTROL
FL201
FLUORESCEN DISPLAY TUBE
IC601
CHARACTER GENERATOR
IC291
REMOTE CONTROL RECEIVER
IC407
TAPE END DET REEL FG AMP
Q121. 122
M 12V SWITCH
MTR 12V
IC410
LOADING MOTOR DRIVE
IC504
EEP ROM
IC501
SERVO SYSTEM CONTROL
Q123
5V SWITCH
5V
D502
D503
D 6V
IC507
POWER FAIL DET
RESET PULSE GENE
IC801
VIDEO SWITCH
IC301
PB/REC AMP SWITCH
IC406
CTL REC/PB AMP
IC403
CAP/DRUM ERROR INTEGRATOR
(See page 4-13)
MA-212 BOARD
CN412
1
MTR 12V
E
DRUM MOTOR DRIVE
DRUM MOTOR
CN413
8
7
MTR 12V
AN 5V
CAPSTAN MOTOR DRIVE
CAPSTAN MOTOR
CN802
15
SW 5V
CN801
7
12V
VI-134 (See page 4-7)
BOARD
CN002
CN001
IC001
SECAM DET
IC101
Y/C MODULE
Q853. 854
REC 9V REG
IC801
VIDEO REC/PB AMP

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring boards:

- o——— : indicates a lead wire mounted on the component side.
- ●——— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒ : Pattern from the side which enables seeing.
- ░ : Pattern of the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

For schematic diagram:

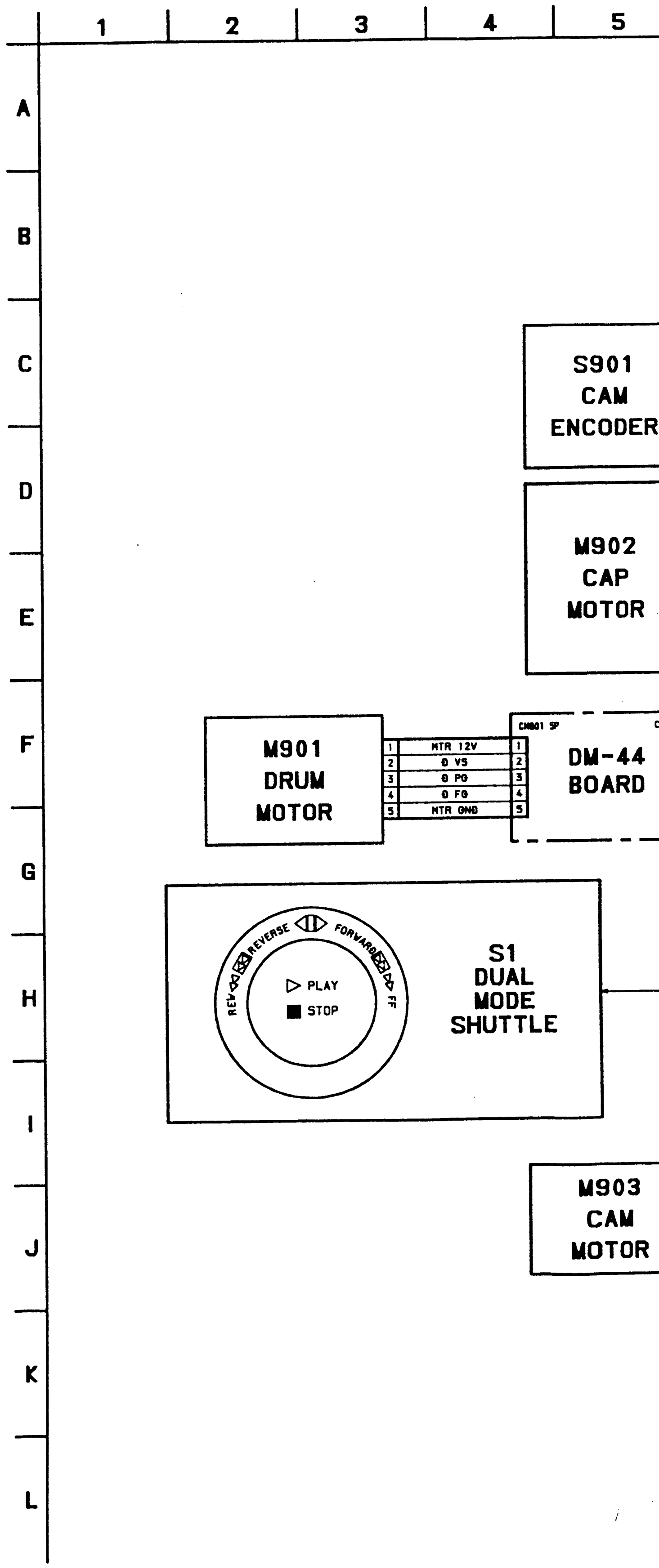
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W (Chip resistors: 1/10W) unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF: μμF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊏⊐ : nonflammable resistor.
- ⊏⊐ : fusible resistor.
- ☐ : panel designation.
- △ : internal component.
- ☐ : adjustment for repair.*
- ━━━ : B + Line.*
- ▬ ▬ ▬ : B − Line.*
- ⇨ : IN/OUT direction of B line (+ , −).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

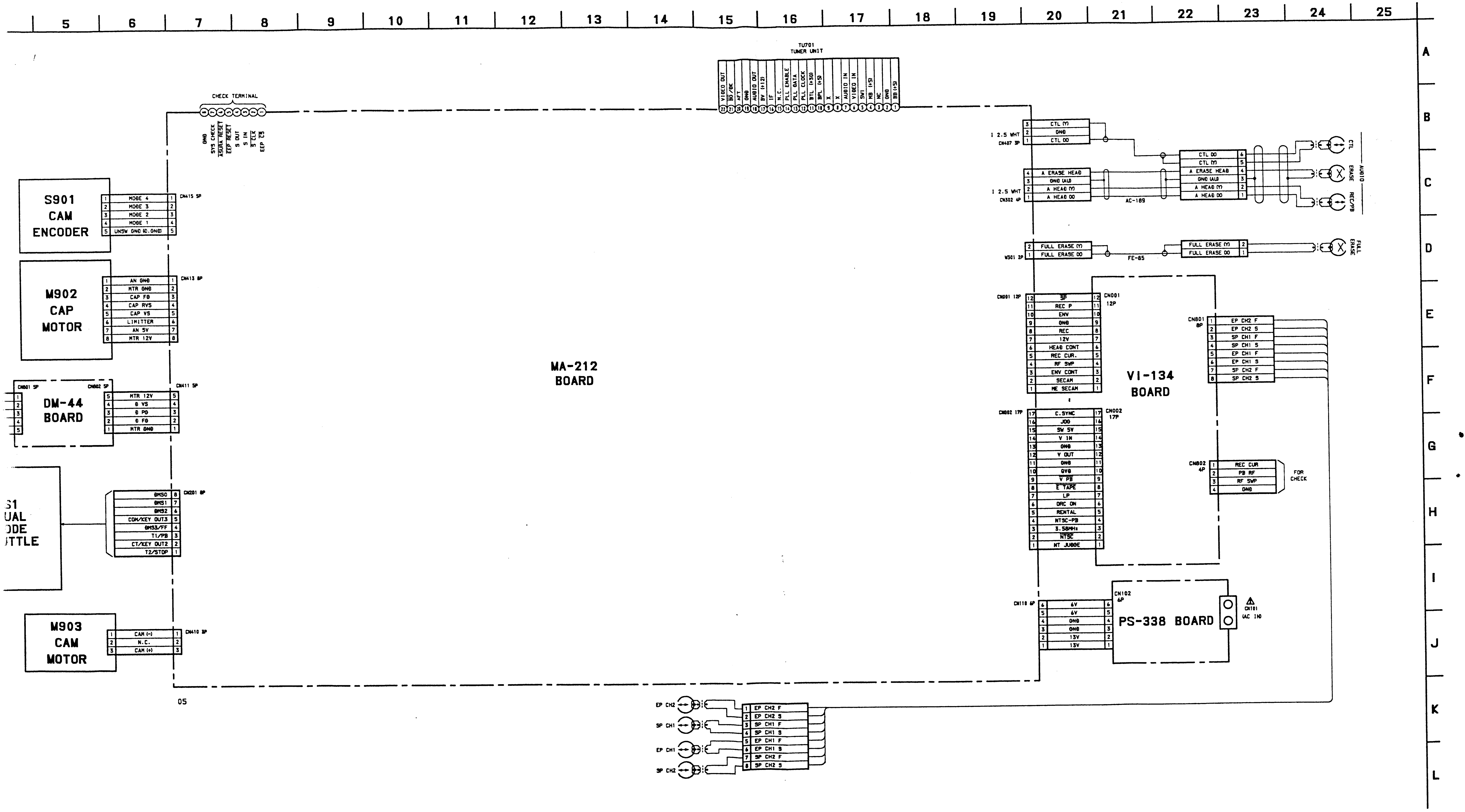
When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

4-1. FRAME SCHEMATIC DIAGRAM



RAM


5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
A
B
C
D
E
F
G
H
I
J
K
L
CHECK TERMINAL
8 GND
7 SYS CHECK
6 ASURA RESET
5 EEP RESET
4 S OUT
3 S IN
2 S CLK
1 EEP CS
TU701
TUNER UNIT
22 VIDEO OUT
21 BG/DK
20 AFT
19 GND
18 AUDIO OUT
17 BV (+12)
16 IF
15 N.C.
14 PLL ENABLE
13 PLL DATA
12 PLL CLOCK
11 BTL (+30)
10 BPL (+5)
9 X
8 X
7 AUDIO IN
6 VIDEO IN
5 SW1
4 MB (+5)
3 NC
2 GND
1 BB (+5)
S901
CAM
ENCODER
CN415 5P
1 MODE 4
2 MODE 3
3 MODE 2
4 MODE 1
5 UNSW GND (D.GND)
M902
CAP
MOTOR
CN413 8P
1 AN GND
2 MTR GND
3 CAP FG
4 CAP RVS
5 CAP VS
6 LIMITTER
7 AN 5V
8 MTR 12V
CN801 5P
CN802 5P
DM-44
BOARD
CN411 5P
5 MTR 12V
4 D VS
3 D PG
2 D FG
1 MTR GND
S1
UAL
DDE
TTLE
CN201 8P
8 DMS0
7 DMS1
6 DMS2
5 COM/KEY OUT3
4 DMS3/FF
3 T1/PB
2 CT/KEY OUT2
1 T2/STOP
M903
CAM
MOTOR
CN410 3P
1 CAM (-)
2 N.C.
3 CAM (+)
05
MA-212
BOARD
I 2.5 WHT
CN407 3P
3 CTL (Y)
2 GND
1 CTL (X)
6 CTL (X)
5 CTL (Y)
4 A ERASE HEAD
3 GND (AU)
2 A HEAD (Y)
1 A HEAD (X)
CTL
ERASE
REC/PB
AUDIO
I 2.5 WHT
CN302 4P
4 A ERASE HEAD
3 GND (AU)
2 A HEAD (Y)
1 A HEAD (X)
AC-189
W301 2P
2 FULL ERASE (Y)
1 FULL ERASE (X)
FE-85
2 FULL ERASE (Y)
1 FULL ERASE (X)
FULL
ERASE
CN001 12P
CN001
12P
12 SP
11 REC P
10 ENV
9 GND
8 REC
7 12V
6 HEAD CONT
5 REC CUR.
4 RF SWP
3 ENV CONT
2 SECAM
1 ME SECAM
VI-134
BOARD
CN801
8P
1 EP CH2 F
2 EP CH2 S
3 SP CH1 F
4 SP CH1 S
5 EP CH1 F
6 EP CH1 S
7 SP CH2 F
8 SP CH2 S
CN002 17P
CN002
17P
17 C.SYNC
16 JOG
15 SW 5V
14 V IN
13 GND
12 V OUT
11 GND
10 QVD
9 V PB
8 E TAPE
7 LP
6 DRC ON
5 RENTAL
4 NTSC-PB
3 3.58MHz
2 NTSC
1 NT JUDGE
CN802
4P
1 REC CUR
2 PB RF
3 RF SWP
4 GND
FOR
CHECK
CN110 6P
CN102
6P
6 6V
5 6V
4 GND
3 GND
2 13V
1 13V
PS-338 BOARD
⚠
CN101
(AC IN)
EP CH2
SP CH1
EP CH1
SP CH2
1 EP CH2 F
2 EP CH2 S
3 SP CH1 F
4 SP CH1 S
5 EP CH1 F
6 EP CH1 S
7 SP CH2 F
8 SP CH2 S

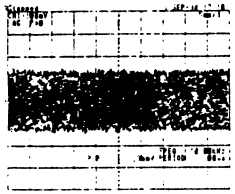
FRAME

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

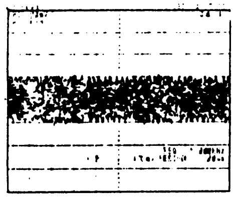
- **Waveforms (PAL)**

VI-134 Board

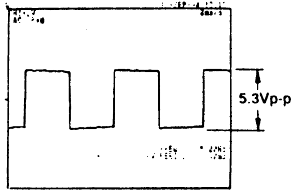
❶ CN802① REC 0.1V/DIV
5ms/DIV



❷ CN802② PB 0.2V/DIV
10ms/DIV

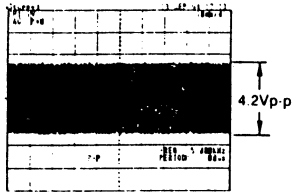


❸ CN802③ REC/PB

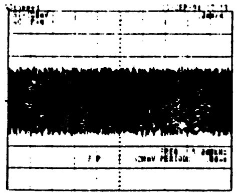


25Hz

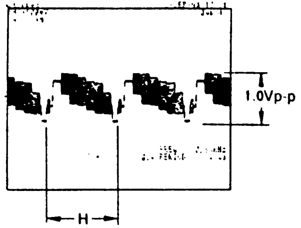
❹ IC801④ REC 1V/DIV
10ms/DIV



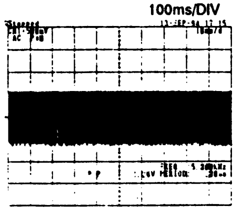
❺ IC801㉕ REC 0.1V/DIV
10ms/DIV



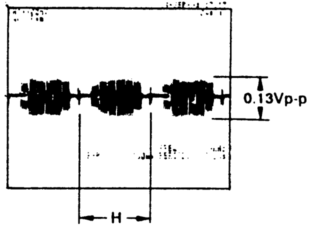
❻ IC101⑩ REC



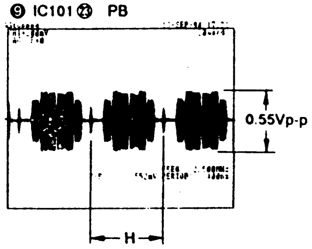
❼ IC101③ REC 0.5V/DIV
100ms/DIV



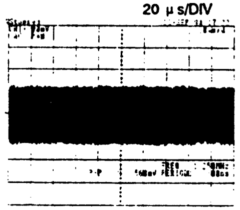
❽ IC101㊳ REC



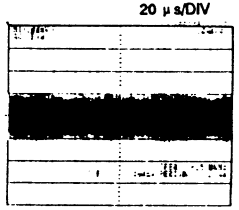
❾ IC101㉓ PB



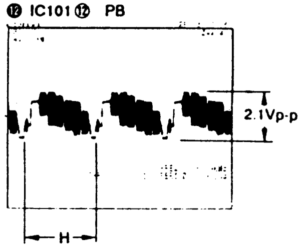
❿ IC101① PB 0.2V/DIV
20 μ s/DIV



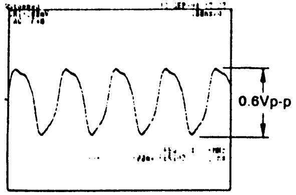
⓫ IC101㊵ PB 0.2V/DIV
20 μ s/DIV



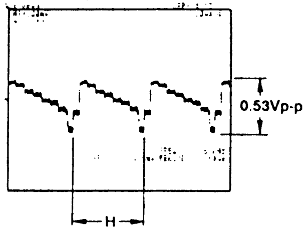
⓬ IC101⑫ PB



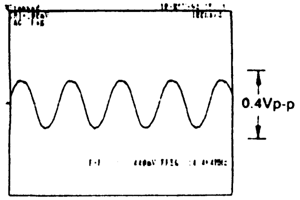
⓭ IC101㉗ REC



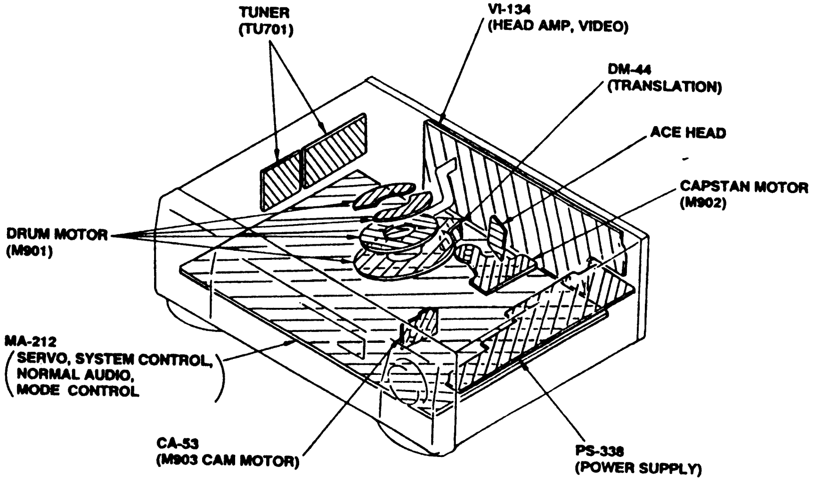
⓮ IC101⑥ PB



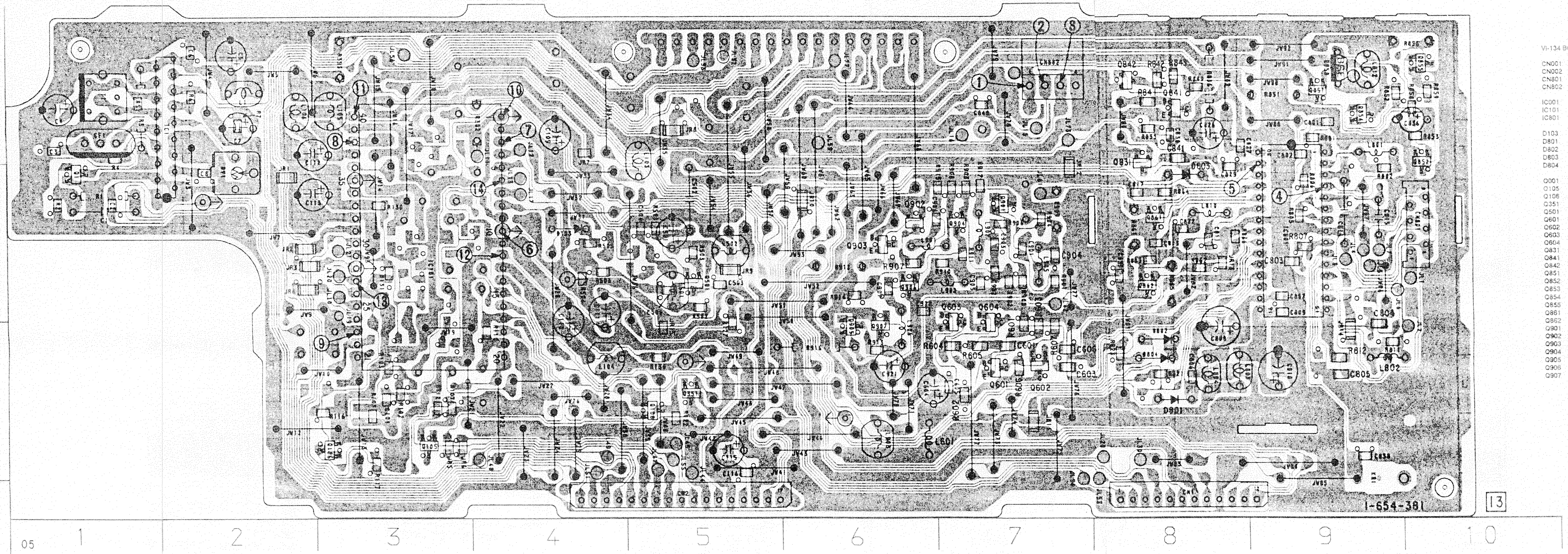
⓯ IC101㉑ REC



4.46 MHz


TUNER
(TU701)
VI-134
(HEAD AMP, VIDEO)
DM-44
(TRANSLATION)
ACE HEAD
CAPSTAN MOTOR
(M902)
DRUM MOTOR
(M901)
MA-212
(SERVO, SYSTEM CONTROL,
NORMAL AUDIO,
MODE CONTROL)
CA-53
(M903 CAM MOTOR)
PS-338
(POWER SUPPLY)

VI-134 (HEAD AMP, VIDEO) PRINTED WIRING BOARD
– Ref. No.: VI-134 Board; 1,000 series –



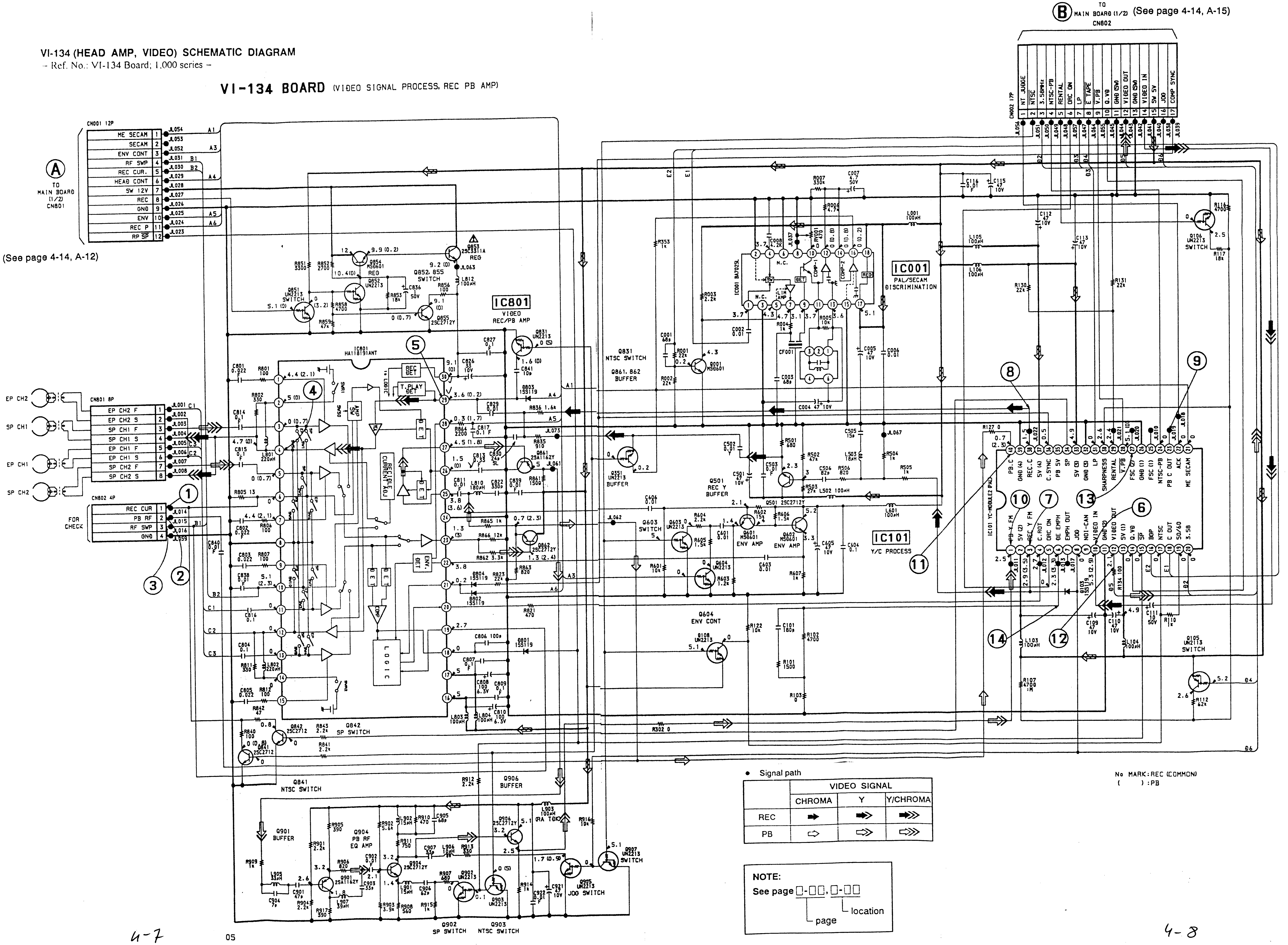
VI-134 BOARD

CN001	D-8
CN002	D-5
CN801	B-10
CN802	A-7
IC001	[illegible]
IC101	[illegible]
IC801	[illegible]
D103	B-4
D801	C-8
D802	C-10
D803	B-8
D804	C-10
Q001	B-1
Q105	C-3
Q106	C-3
Q351	C-5
Q501	B-7
Q601	C-7
Q602	C-7
Q603	C-7
Q604	C-7
Q831	A-8
Q841	A-8
Q842	A-8
Q851	A-9
Q852	B-10
Q853	[illegible]
Q854	[illegible]
Q855	[illegible]
Q861	B-10
Q862	B-10
Q901	B-9
Q902	B-8
Q903	B-6
Q904	B-9
Q905	C-8
Q906	B-6
Q907	C-6

VI-134 (HEAD AMP, VIDEO) SCHEMATIC DIAGRAM

– Ref. No.: VI-134 Board; 1,000 series –

VI-134 BOARD (VIDEO SIGNAL PROCESS, REC PB AMP)


A
TO MAIN BOARD (1/2) CN801
(See page 4-14, A-12)
CN001 12P
1 ME SECAM
2 SECAM
3 ENV CONT
4 RF SWP
5 REC CUR.
6 HEAD CONT
7 SW 12V
8 REC
9 GND
10 ENV
11 REC P
12 RP SP
B
TO MAIN BOARD (1/2) CN802 (See page 4-14, A-15)
CN002 17P
1 NT JUDGE
2 NTSC
3 3.58MHz
4 NTSC-PB
5 RENTAL
6 DRC ON
7 LP
8 E TAPE
9 V.PB
10 Q.V0
11 GND (SW)
12 VIDEO OUT
13 GND (SW)
14 VIDEO IN
15 SW 5V
16 JOG
17 COMP SYNC
CN801 8P
EP CH2 F
EP CH2 S
SP CH1 F
SP CH1 S
EP CH1 F
EP CH1 S
SP CH2 F
SP CH2 S
EP CH2
SP CH1
EP CH1
SP CH2
CN802 4P
REC CUR
PB RF
RF SWP
GND
FOR CHECK
IC801 VIDEO REC/PB AMP
IC801 HA118191ANT
LOGIC
REC DET
T.PLAY DET
RECCIRCLE CURRENT ADJ
ENV. DET
Q851 UN2213 SWITCH
Q854 MS0601 REG
Q853 2SC3311A REG
Q852, 855 SWITCH
Q855 2SC2712Y
Q831 UN2213
Q831 NTSC SWITCH
Q861 2SA1162Y
Q861, 862 BUFFER
Q862 2SC2712Y
Q842 2SC2712
Q842 SP SWITCH
Q841 2SC2712
Q841 NTSC SWITCH
Q901 BUFFER
Q901 2SA1162Y
Q904 PB RF EQ AMP
Q904 2SC2712Y
Q906 2SC2712Y
Q906 BUFFER
Q902 UN2213
Q902 SP SWITCH
Q903 UN2213
Q903 NTSC SWITCH
Q905 UN2213
Q905 JOG SWITCH
Q907 UN2213
Q907 SWITCH
IC001 BA7025L
IC001 PAL/SECAM DISCRIMINATION
Q001 MS0601
Q351 UN2213 BUFFER
Q501 REC Y BUFFER
Q501 2SC2712Y
Q603 SWITCH
Q603 UN2213
Q601 MS0601 ENV AMP
Q602 MS0601 ENV AMP
Q604 UN2213
Q604 ENV CONT
Q108 UN2213
IC101 Y/C PROCESS
IC101 YC-MODULE2 PAL
PB Y FM
5V (2)
REC Y FM
C.ROT
DE EMPH
EMPH OUT
JOG
NOI-CAN
VIDEO IN
GND (2)
VIDEO OUT
5V (1)
Q.V0
SP
BGP
NTSC
50/60
3.58
PB C
GND (4)
REC.C
5V (4)
C.SYNC
PB 5V
SP
5V (3)
GND (3)
LP
SHARPNESS
RENTAL
V.PB
FSC (2)
GND (1)
FSC (1)
NTSC-PB
PB C OUT
ACK
ME SECAM
Q106 UN2213 SWITCH
Q105 UN2113 SWITCH
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭

- Signal path

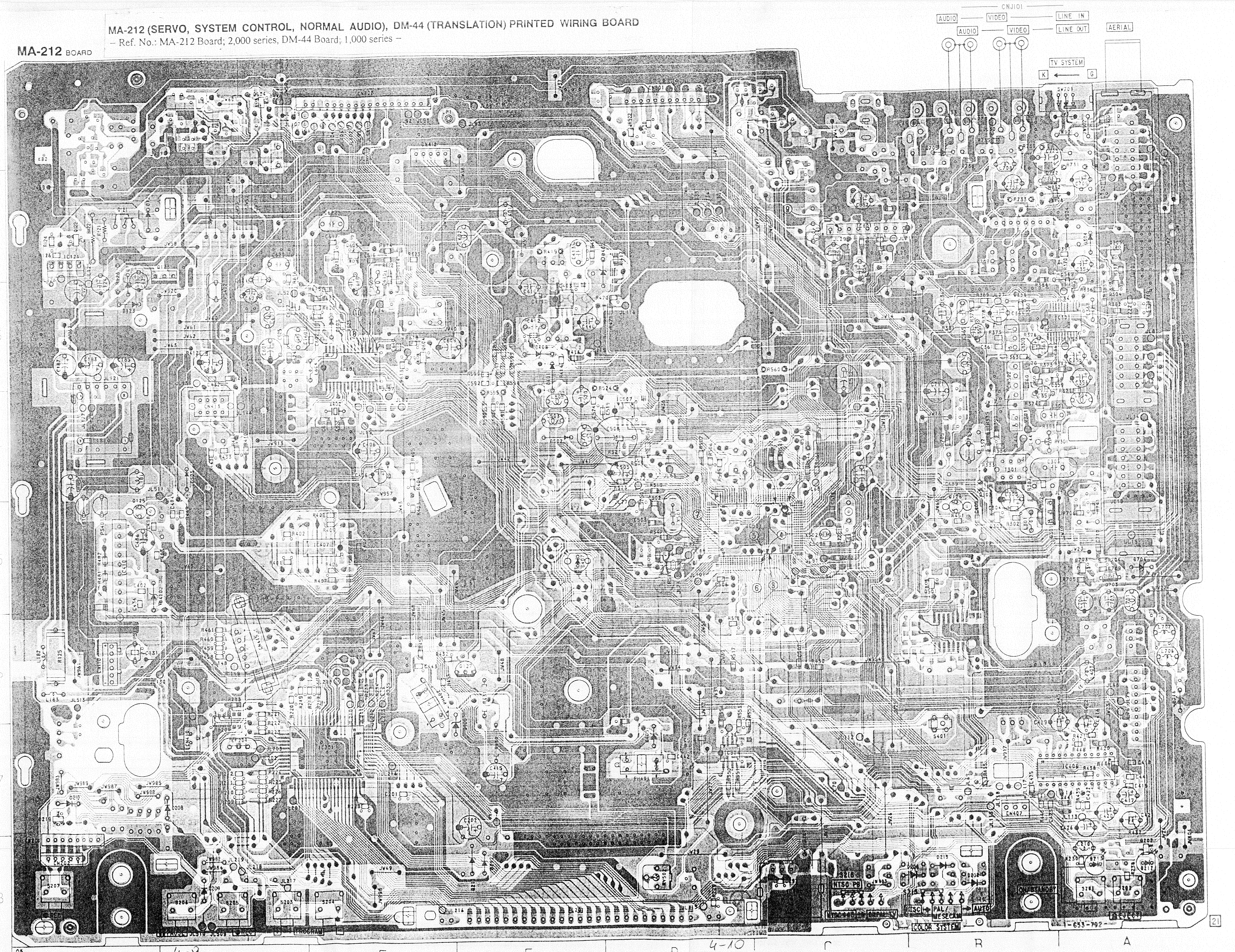
	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	➡	⇛	⇛
PB	⇨	⇨	⇨

No MARK: REC (COMMON)
(　　) : PB

NOTE:
See page □-□□, □-□□
└ location
└ page

MA-212 (SERVO, SYSTEM CONTROL, NORMAL AUDIO), DM-44 (TRANSLATION) PRINTED WIRING BOARD

– Ref. No.: MA-212 Board; 2,000 series, DM-44 Board; 1,000 series –

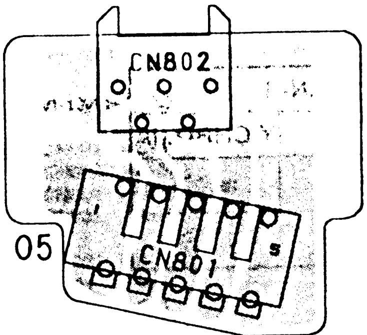

MA-212 BOARD
CNJ101
AUDIO
VIDEO
LINE IN
AUDIO
VIDEO
LINE OUT
AERIAL
TV SYSTEM
K
G
NTSC PB
NTSC
PAL/MESECAM
AUTO
COLOR SYSTEM
653-792
21
H
4-9
G
F
E
D
4-10
C
B
A

4-11

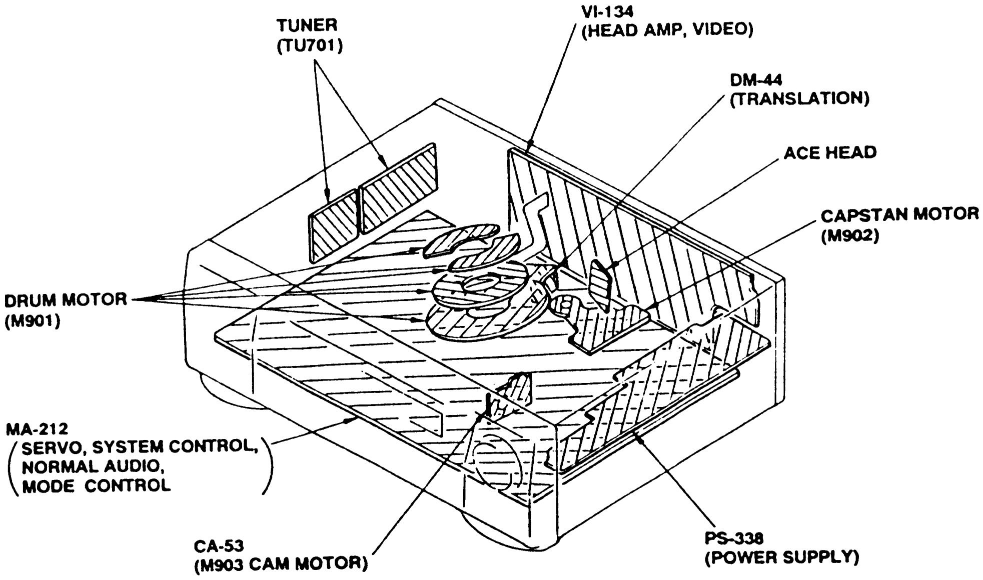
MA-212 BOARD

CN110	H-6
CN201	H-8
CN302	B-3
CN303	B-3
CN407	B-7
CN410	G-7
CN411	D-2
CN413	G-4
CN415	G-6
CN801	D-1
CN802	F-1
D121	H-2
D122	H-3
D123	H-3
D206	B-8
D208	G-7
D209	G-8
D210	H-7
D211	E-8
D212	E-8
D213	A-8
D215	B-8
D217	A-8
D219	H-7
D304	A-2
D401	E-3
D402	D-3
D405	D-7
D406	F-7
D407	E-5
D408	E-3
D410	H-5
D501	C-4
D502	E-4
D503	G-4
D603	F-3
D703	A-5
D704	A-5
D705	B-2
D706	C-2
D709	B-2
D716	A-6
IC121	H-2
IC201	F-7
IC291	C-8
IC301	A-3
IC403	E-3
IC406	A-7
IC407	F-5
IC410	H-5
IC501	D-5
IC504	D-7
IC507	D-4
IC601	F-3
IC801	C-2
Q121	H-2
Q122	H-2
Q123	G-2
Q125	H-5
Q126	B-5
Q127	E-6
Q202	A-8
Q301	B-5
Q302	B-5
Q303	B-5
Q304	A-3
Q305	A-3
Q501	B-5
Q504	G-1
Q604	F-3
Q605	F-2
Q703	A-5
Q712	B-2

DM-44 BOARD


CN802
05
CN801
5

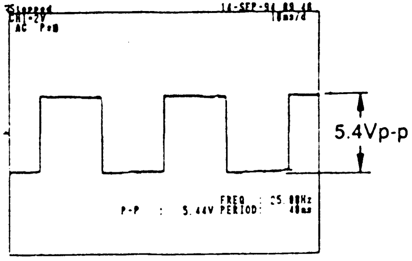
1 - 654 - 057 - 12


TUNER
(TU701)
VI-134
(HEAD AMP, VIDEO)
DM-44
(TRANSLATION)
ACE HEAD
CAPSTAN MOTOR
(M902)
DRUM MOTOR
(M901)
MA-212
(SERVO, SYSTEM CONTROL,
NORMAL AUDIO,
MODE CONTROL)
CA-53
(M903 CAM MOTOR)
PS-338
(POWER SUPPLY)

- **Waveforms**

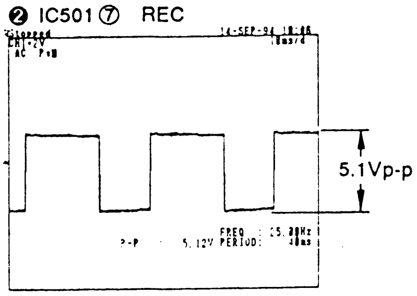
MA-212 Board

❶ IC501 ① REC/PB



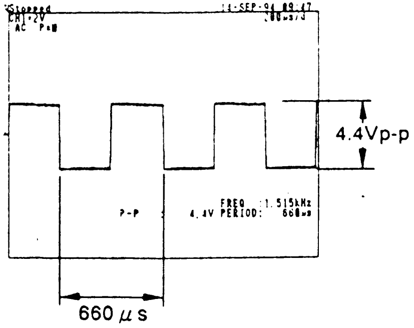
25Hz

❷ IC501 ⑦ REC

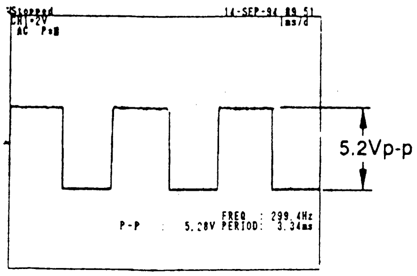


25Hz

❸ IC501 (70) REC/PB

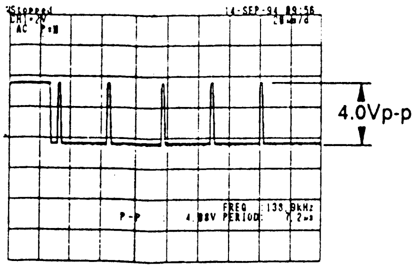


❹ IC501 (69) REC/PB

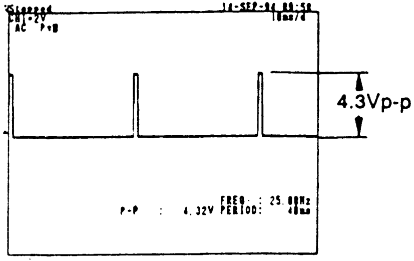


300Hz

❺ IC501 (66) REC/PB 2V/div
20 μ sec/div

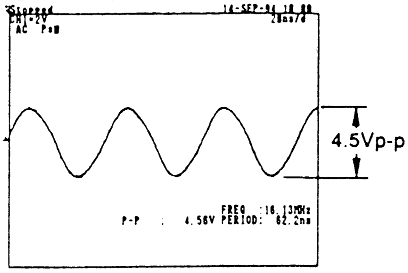


❻ IC501 (68) REC/PB



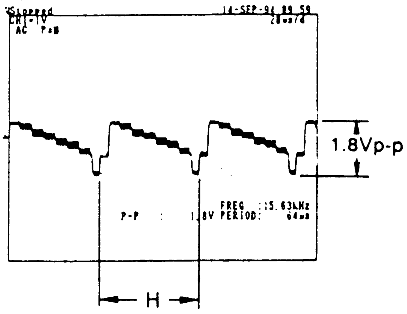
25Hz

❼ IC501 ㊷ REC/PB

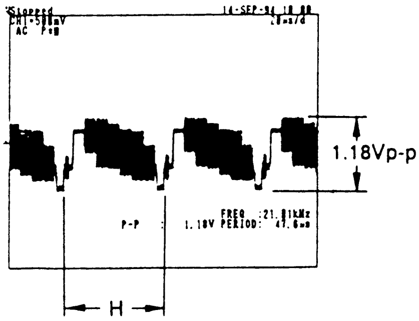


16MHz

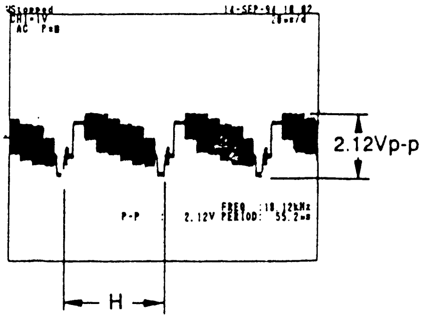
❽ IC601 ⑳ REC/PB



❾ IC801 ⑧ REC

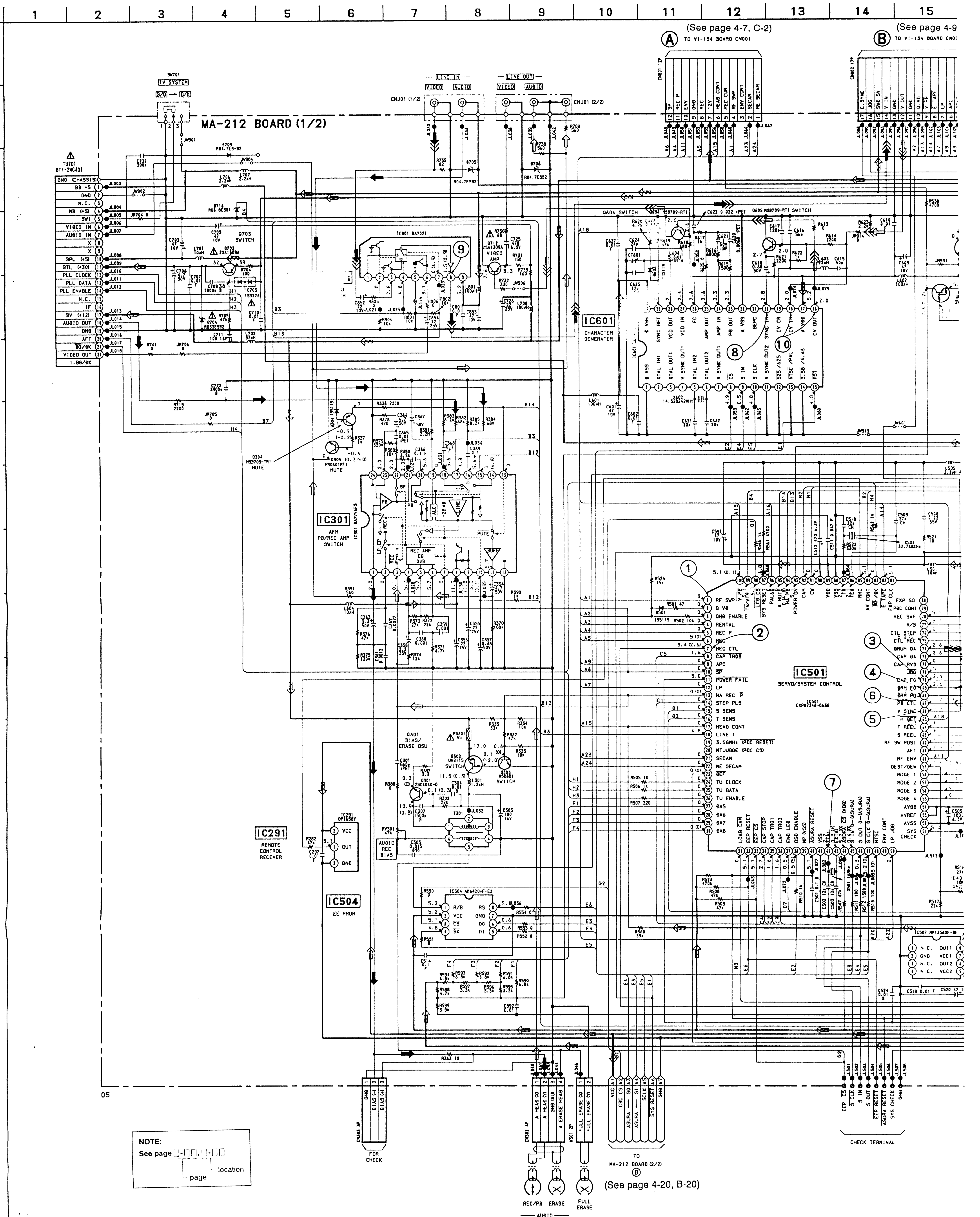


❿ IC601 ⑯, ⑱ REC/PB



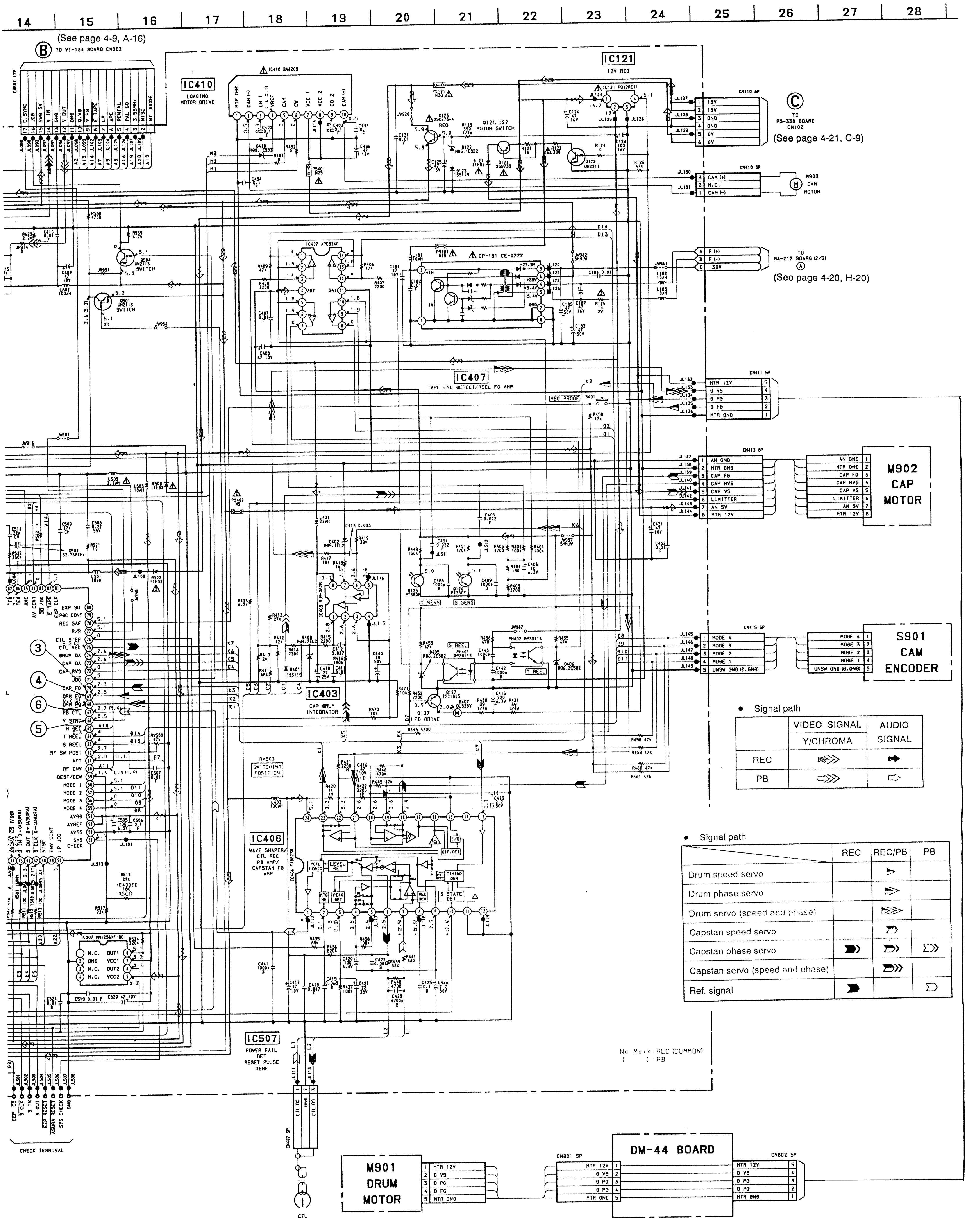
MA-212 (SERVO, SYSTEM CONTROL, NORMAL AUDIO), DM-44 (TRANSLATION) SCHEMATIC DIAGRAM

– Ref. No.: MA-212 Board; 2,000 series, DM-44 Board; 1,000 series –



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
(See page 4-7, C-2)
Ⓐ TO VI-134 BOARD CN001
(See page 4-9
Ⓑ TO VI-134 BOARD CN0
MA-212 BOARD (1/2)
SW701 TV SYSTEM
LINE IN VIDEO AUDIO
LINE OUT VIDEO AUDIO
CNJ01 (1/2)
CNJ01 (2/2)
TU701 BTF-2WG401
GND (CHASSIS)
BB +5
GND
N.C.
MB (+5)
SW1
VIDEO IN
AUDIO IN
X
X
BPL (+5)
BTL (+30)
PLL CLOCK
PLL DATA
PLL ENABLE
N.C.
IF
BV (+12)
AUDIO OUT
GND
AFT
BO/OK
VIDEO OUT
1.BO/OK
IC801 BA7021
Q703 SWITCH
Q712 VIDEO AMP
Q604 SWITCH
Q605 M58709-RT1 SWITCH
IC601 CHARACTER GENERATER
IC301 AFM PB/REC AMP SWITCH
Q304 M58709-TR1 MUTE
Q305 M58601RT1 MUTE
Q301 BIAS/ERASE OSU
Q302 UN2115 SWITCH
Q303 M58601 SWITCH
IC291 REMOTE CONTROL RECEVER
IC504 EE PROM
IC504 AK6420HF-E2
IC501 SERVO/SYSTEM CONTROL
IC501 CXP87248-063Q
IC507 MM1254XF-BE
AUDIO REC BIAS
CN303 3P
FOR CHECK
CN302 4P
W301 2P
REC/PB ERASE
FULL ERASE
AUDIO
TO MA-212 BOARD (2/2) Ⓑ
(See page 4-20, B-20)
CHECK TERMINAL
GND
BIAS (-)
BIAS (+)
A HEAD (0)
A HEAD (M)
GND (AU)
A ERASE HEAD
FULL ERASE (0)
FULL ERASE (M)
VCC
CBC CS
ASURA SO
ASURA SI
SCLK
SYS RESET
GND
EEP CS
S CLK
S IN
S OUT
EEP RESET
ASURA RESET
SYS CHECK
GND
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
05

NOTE:
See page □-□□,□-□□
page
location


14
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27
28
(See page 4-9, A-16)
Ⓑ TO VI-134 BOARD CN002
IC410
LOADING MOTOR DRIVE
IC410 BA6209
IC121
12V REG
IC121 PQ12RE11
CN110 6P
13V
13V
GND
GND
6V
6V
Ⓒ
TO PS-338 BOARD CN102
(See page 4-21, C-9)
Q123 2SD773-4 REG
Q121, 122 MOTOR SWITCH
CN410 3P
CAM (+)
N.C.
CAM (-)
M903 CAM MOTOR
Q504 UN2113 SWITCH
Q501 UN2113 SWITCH
IC407 μPC324G
CP-181 CE-0777
F (+)
F (-)
-30V
TO MA-212 BOARD (2/2) Ⓐ
(See page 4-20, H-20)
IC407
TAPE END DETECT/REEL FG AMP
REC PROOF
CN411 5P
MTR 12V
0 VS
0 PG
0 FG
MTR GND
CN413 8P
AN GND
MTR GND
CAP FG
CAP RVS
CAP VS
LIMITTER
AN 5V
MTR 12V
M902 CAP MOTOR
X502 32.768kHz
T SENS
S SENS
S REEL
T REEL
CN415 5P
MODE 4
MODE 3
MODE 2
MODE 1
UNSW GND (D.GND)
S901 CAM ENCODER
IC403
CAP DRUM INTEGRATOR
Q127 LED DRIVE
RV502 SWITCHING POSITION
IC406
WAVE SHAPER/ CTL REC PB AMP/ CAPSTAN FG AMP
IC507
POWER FAIL DET RESET PULSE GENE
IC507 MM1234XF-BE
CHECK TERMINAL
EEP CS
S CLK
S IN
S OUT
EEP RESET
ASURA RESET
SYS CHECK
GND
CN427 3P
CTL DO
GND
CTL DY
CTL
M901 DRUM MOTOR
DM-44 BOARD
CN801 5P
CN802 5P
No Mark : REC (COMMON)
( ) : PB
③
④
⑥
⑤

- Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	▶▶▶	➡
PB	⇨▷▷	⇨

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷▷	
Drum servo (speed and phase)		▷▷▷	
Capstan speed servo		▷	
Capstan phase servo	▶▶	▷▷	▷▷
Capstan servo (speed and phase)		▷▷▷	
Ref. signal	▶		▷

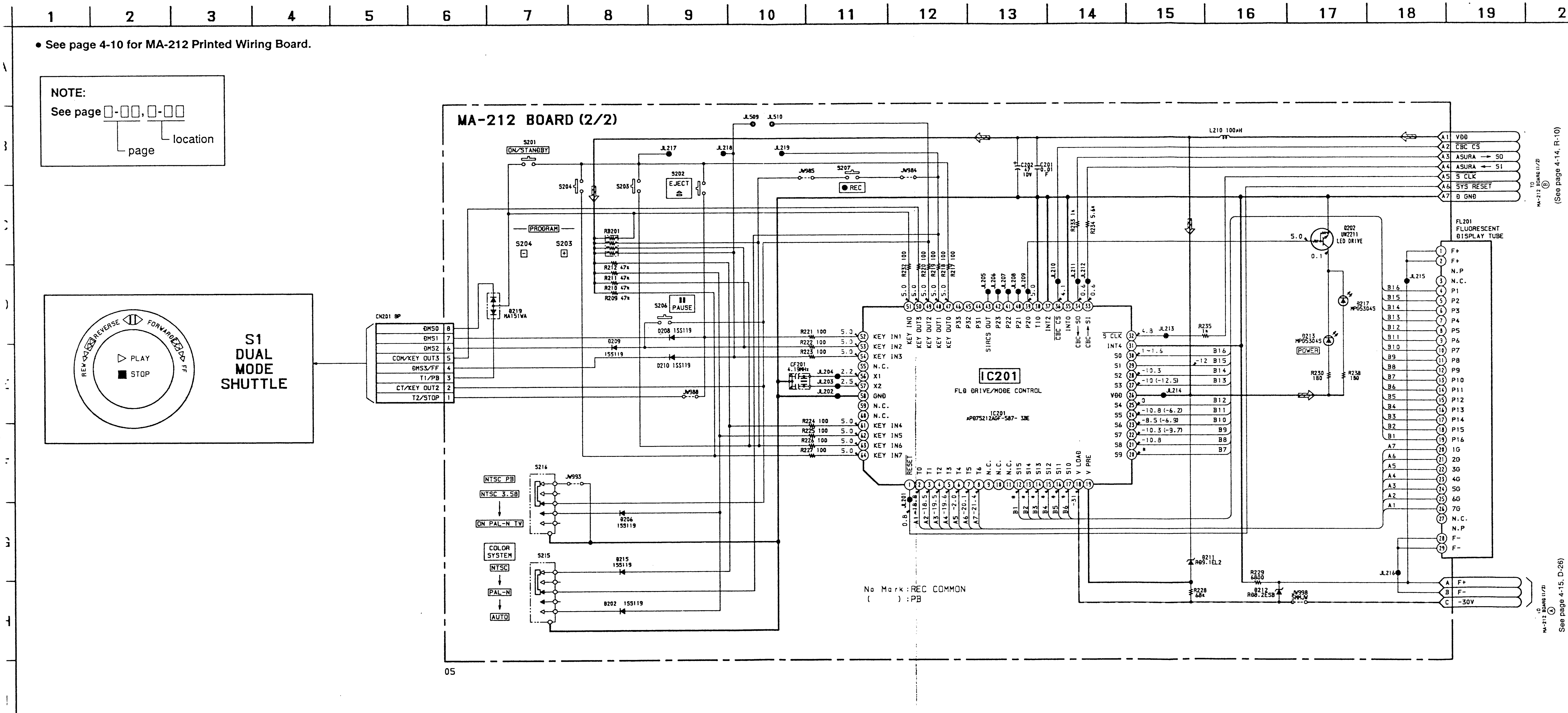
4-16

MA-212 (MODE CONTROL) SCHEMATIC DIAGRAM

– Ref. No.: MA-212 Board; 2,000 series –

- See page 4-10 for MA-212 Printed Wiring Board.

NOTE:
See page □-□□, □-□□
page
location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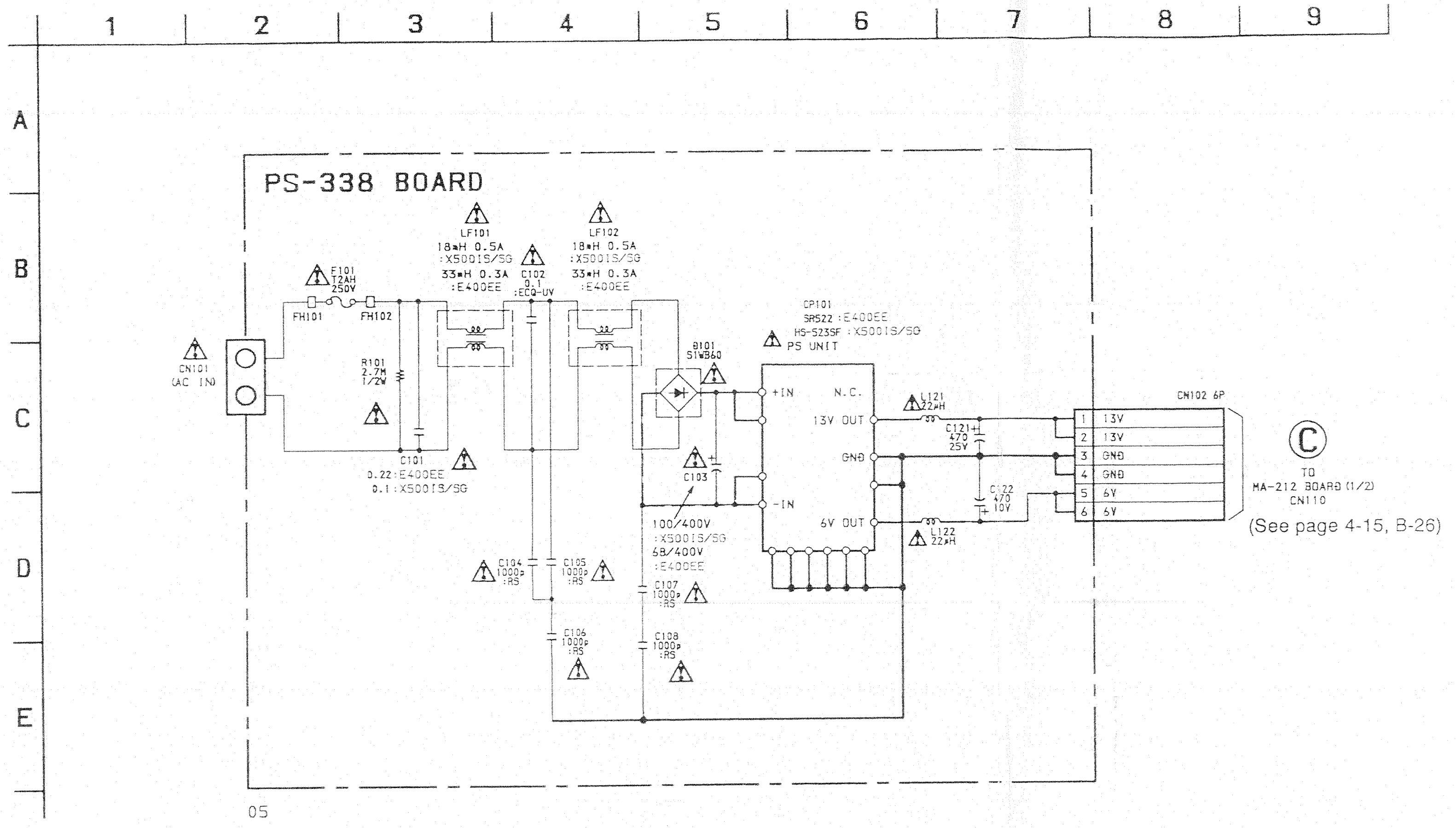
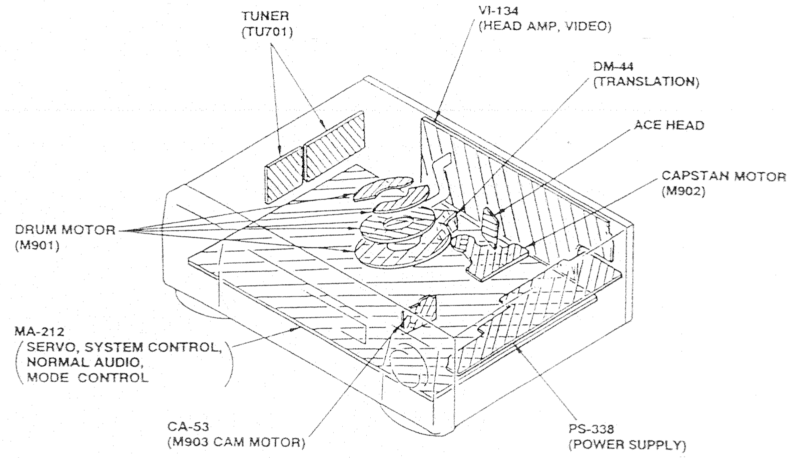
16
17
18
19
MA-212 BOARD (2/2)
S1
DUAL
MODE
SHUTTLE
REVERSE
FORWARD
REW
FF
PLAY
STOP
CN201 8P
OMS0
OMS1
OMS2
COM/KEY OUT3
OMS3/FF
T1/PB
CT/KEY OUT2
T2/STOP
S201
ON/STANDBY
S204
S203
S202
EJECT
S207
REC
PROGRAM
S206
PAUSE
RB201
R212 47k
R211 47k
R210 47k
R209 47k
D219
MA151WA
D208 1SS119
D209 1SS119
D210 1SS119
CF201 4.19MHz
R221 100
R222 100
R223 100
R224 100
R225 100
R226 100
R227 100
R232 100
R220 100
R219 100
R218 100
R217 100
R233 1k
R234 5.6k
R235 1k
JL509
JL510
JL217
JL218
JL219
JW985
JW984
JW988
JW993
JL201
JL202
JL203
JL204
JL205
JL206
JL207
JL208
JL209
JL210
JL211
JL212
JL213
JL214
JL215
JL216
C202 47 10V
C201 0.01 F
L210 100μH
IC201
FLD DRIVE/MODE CONTROL
IC201
μPD75212AGF-587-3BE
KEY IN1
KEY IN2
KEY IN3
N.C.
X1
X2
GND
N.C.
N.C.
KEY IN4
KEY IN5
KEY IN6
KEY IN7
KEY IN0
KEY OUT3
KEY OUT2
KEY OUT1
KEY OUT0
P33
P32
P31
SIRCS OUT
P23
P22
P21
P20
T10
INT2
CBC CS
INT0
CBC ← S0
CBC → S1
S CLK
INT4
S0
S1
S2
S3
VDD
S4
S5
S6
S7
S8
S9
RESET
T0
T1
T2
T3
T4
T5
T6
N.C.
N.C.
N.C.
S15
S14
S13
S12
S11
S10
V LOAD
V PRE
A1 -18.8
A2 -18.5
A3 -19.5
A4 -19.6
A5 -2.0
A6 -20.1
A7 -21.4
B1
B2
B3
B4
B5
B6
-31
4.8
1~1.6
-10.3
-10 (-12.5)
-10.8 (-6.2)
-8.5 (-6.9)
-10.3 (-9.7)
-10.8
-12
B16
B15
B14
B13
B12
B11
B10
B9
B8
B7
A1 VDD
A2 CBC CS
A3 ASURA → S0
A4 ASURA ← S1
A5 S CLK
A6 SYS RESET
A7 D GND
TO MA-212 BOARD (1/2) Ⓑ
(See page 4-14, R-10)
Q202
UN2211
LED DRIVE
5.0
0.1
D217
MPG5304S
D213
MPG5304S
POWER
R230 180
R238 180
FL201
FLUORESCENT
DISPLAY TUBE
F+
F+
N.P
N.C.
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
1G
2G
3G
4G
5G
6G
7G
N.C.
N.P
F-
F-
A F+
B F-
C -30V
TO MA-212 BOARD (1/2) Ⓐ
See page 4-15, D-26)
D211
RD9.1EL2
R228 68k
R229 6800
D212
RD8.2ESB
JW998
SHORT
S216
NTSC PB
NTSC 3.58
ON PAL-N TV
D206 1SS119
S215
COLOR SYSTEM
NTSC
PAL-N
AUTO
D215 1SS119
D202 1SS119
No Mark : REC COMMON
( ) : PB
05

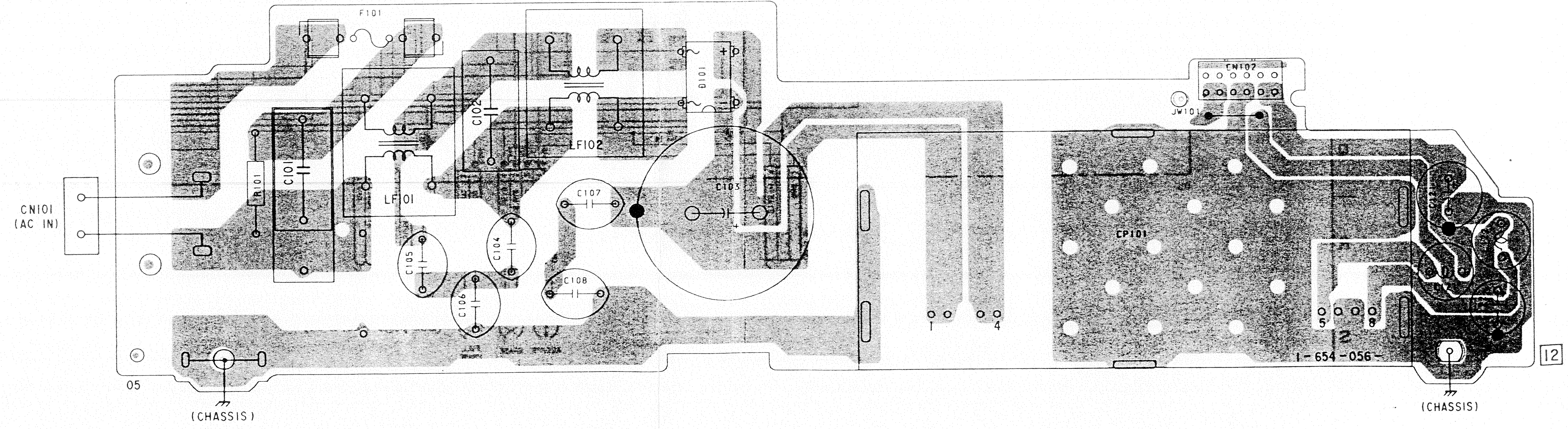
PS-338 (POWER SUPPLY) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

– Ref. No.: PS-338 Board; 3,000 series –

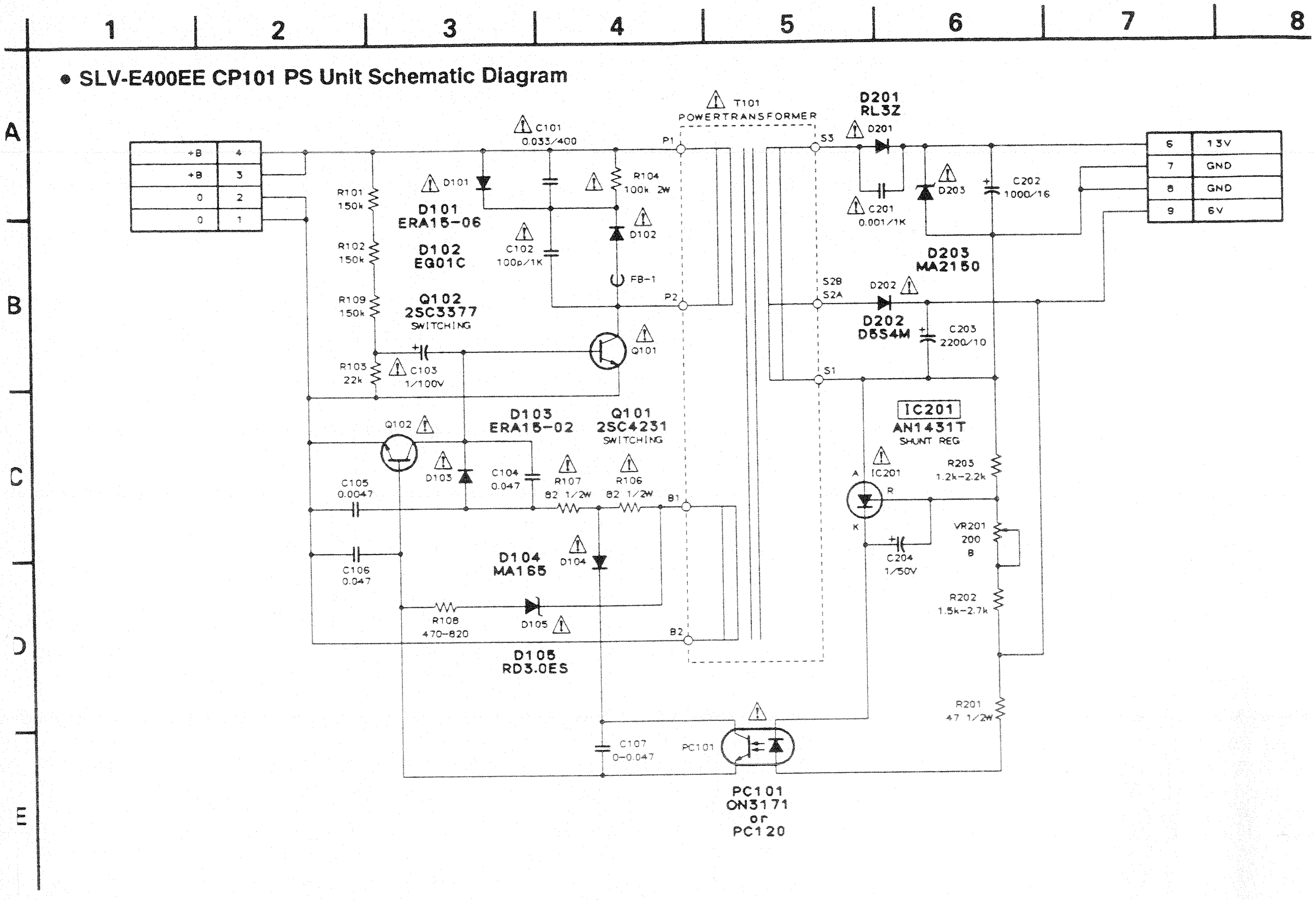

1
2
3
4
5
6
7
8
9
A
B
C
D
E
PS-338 BOARD
CN101
(AC IN)
F101
T2AH
250V
FH101
FH102
R101
2.7M
1/2W
C101
0.22:E400EE
0.1:X500IS/SG
LF101
18mH 0.5A
:X500IS/SG
33mH 0.3A
:E400EE
C102
0.1
:ECQ-UV
LF102
18mH 0.5A
:X500IS/SG
33mH 0.3A
:E400EE
D101
S1WB60
C103
100/400V
:X500IS/SG
68/400V
:E400EE
C104
1000p
:RS
C105
1000p
:RS
C106
1000p
:RS
C107
1000p
:RS
C108
1000p
:RS
CP101
SR522 :E400EE
HS-523SF :X500IS/SG
PS UNIT
+IN
N.C.
13V OUT
GND
-IN
6V OUT
L121
22μH
C121
470
25V
C122
470
10V
L122
22μH
CN102 6P
1 13V
2 13V
3 GND
4 GND
5 6V
6 6V
C
TO
MA-212 BOARD (1/2)
CN110
(See page 4-15, B-26)
05


TUNER
(TU701)
VI-134
(HEAD AMP, VIDEO)
DM-44
(TRANSLATION)
ACE HEAD
CAPSTAN MOTOR
(M902)
DRUM MOTOR
(M901)
MA-212
SERVO, SYSTEM CONTROL,
NORMAL AUDIO,
MODE CONTROL
CA-53
(M903 CAM MOTOR)
PS-338
(POWER SUPPLY)

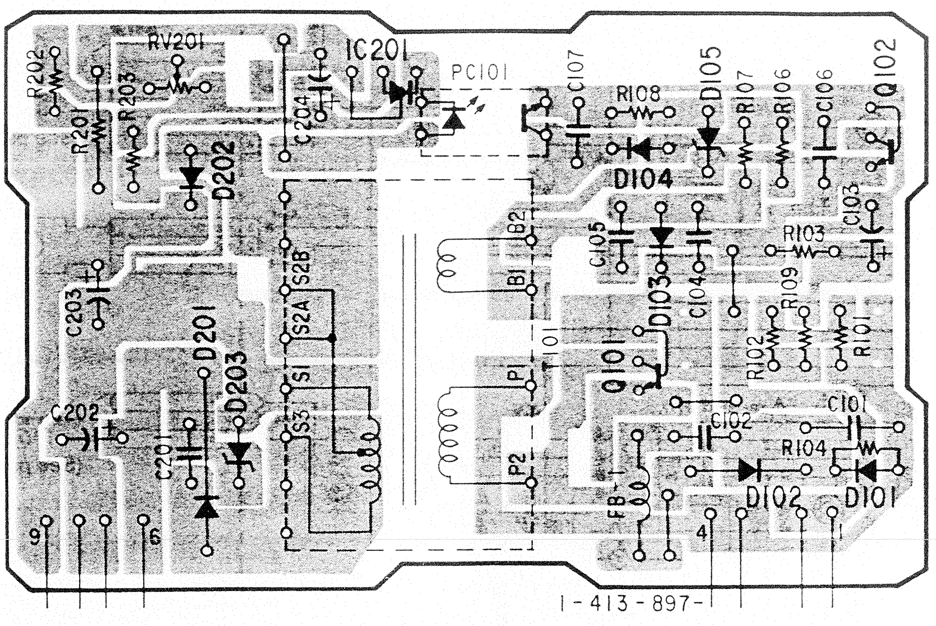
PS-338 BOARD


F101
CN101
(AC IN)
R101
C101
LF101
C102
LF102
D101
C103
C107
C104
C105
C106
C108
CP101
CN102
JW101
1
4
5
8
1-654-056-
12
05
(CHASSIS)
(CHASSIS)

• SLV-E400EE CP101 PS Unit Schematic Diagram


1
2
3
4
5
6
7
8
A
B
C
D
E
+B 4
+B 3
0 2
0 1
C101 0.033/400
T101 POWERTRANSFORMER
D201 RL3Z
P1
S3
D101
D101 ERA15-06
R104 100k 2W
R101 150k
R102 150k
D102 EG01C
C102 100p/1K
D102
FB-1
R109 150k
Q102 2SC3377 SWITCHING
P2
S2B
S2A
Q101
R103 22k
C103 1/100V
D103 ERA15-02
Q101 2SC4231 SWITCHING
Q102
C105 0.0047
D103
C104 0.047
R107 82 1/2W
R106 82 1/2W
B1
C106 0.047
D104 MA165
D104
R108 470-820
D105
B2
D105 RD3.0ES
C107 0-0.047
PC101
PC101 ON3171 or PC120
C201 0.001/1K
D203
C202 1000/16
D203 MA2150
D202
D202 D5S4M
C203 2200/10
S1
IC201 AN1431T SHUNT REG
IC201
A
R
K
R203 1.2k-2.2k
VR201 200 B
C204 1/50V
R202 1.5k-2.7k
R201 47 1/2W
6 13V
7 GND
8 GND
9 6V

• SLV-E400EE PS Unit Printed Wiring Board


R202
RV201
IC201
PC101
C107
R108
D105
R107
R106
C106
Q102
R201
R203
C204
D202
D104
B2
C105
R103
C103
B1
D103
C104
R109
C203
S2B
S2A
T101
D201
Q101
R102
R101
S1
P1
C202
D203
S3
C101
C201
C102
R104
P2
FB-1
D102
D101
9
6
4
1
1-413-897-

SECTION 5
REPAIR PARTS LIST

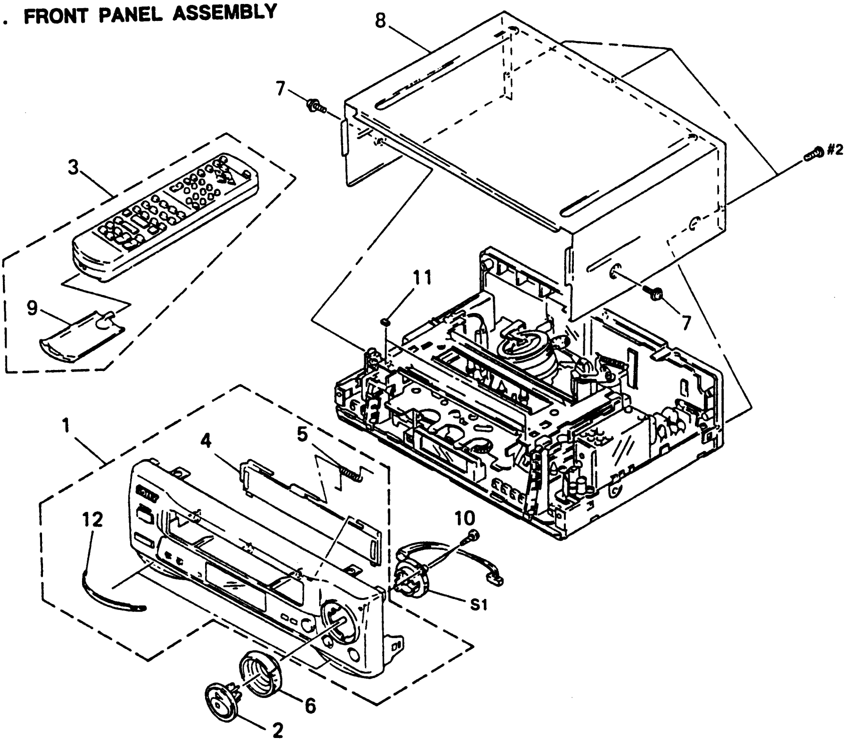
5-1. EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

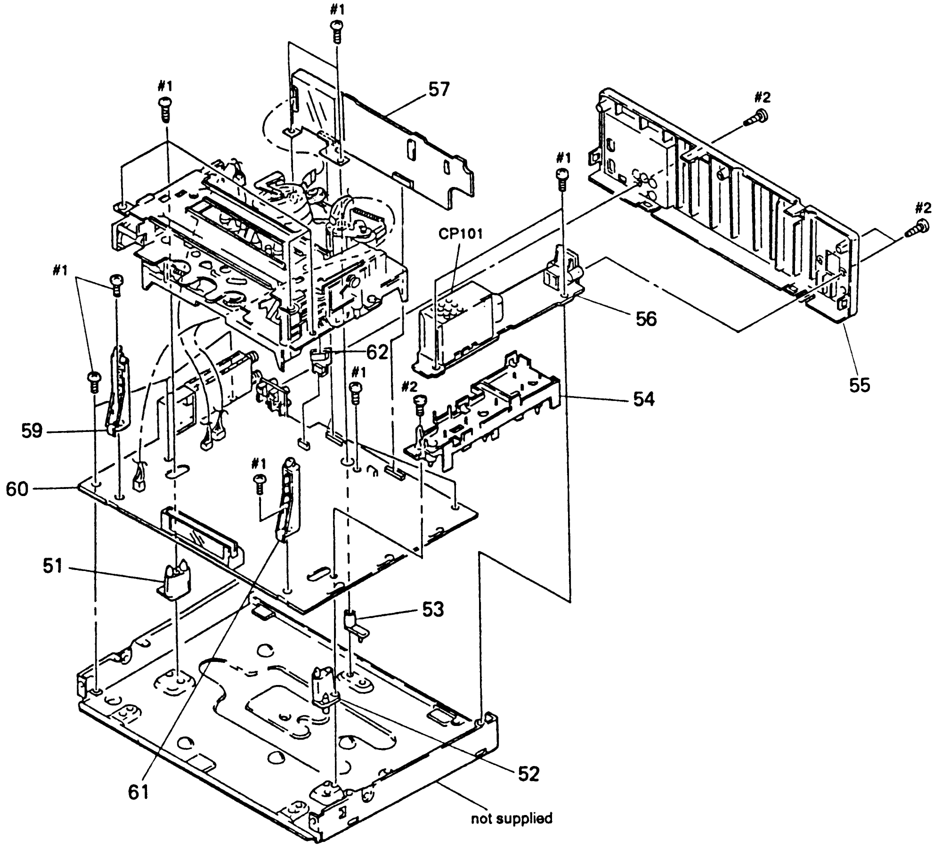
5-1-1. FRONT PANEL ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	X-3944-573-1	PANEL ASSY, FRONT (E400EE)	
1	X-3944-703-1	PANEL ASSY, FRONT (X500:IS)	
1	X-3944-714-2	PANEL ASSY, FRONT (X500:SG, ME)	
2	X-3944-574-1	BUTTON ASSY, FUNCTION (E400EE)	
2	X-3944-791-1	BUTTON ASSY, FUNCTION (X500:SG, ME)	
2	X-3944-909-1	BUTTON ASSY, FUNCTION (X500:IS)	
3	1-467-832-21	REMOTE COMMANDER (RMT-V153A)	
4	3-959-399-01	DOOR, CASSETTE (X500)	
4	3-959-399-31	DOOR, CASSETTE (E400EE)	
5	3-959-400-01	SPRING, FL	
6	3-959-379-01	RING, SHUTTLE (X500:SG, ME)	
6	3-959-379-11	RING, SHUTTLE (E400EE)	
6	3-959-379-31	RING, SHUTTLE (X500:IS)	
7	3-710-901-11	SCREW (TP3X8), CASE	
* 8	3-959-393-01	CASE, UPPER (X500:SG, ME)	
* 8	3-961-359-01	CASE, UPPER (E400EE/X500:IS)	
9	3-708-885-01	COVER, BATTERY	
10	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
11	3-961-135-01	CUSHION, RUBBER	
12	3-961-443-01	INSULATOR (X500:SG, ME)	
12	3-961-443-11	INSULATOR (E400EE)	
S1	1-572-662-71	SWITCH, ROTARY	

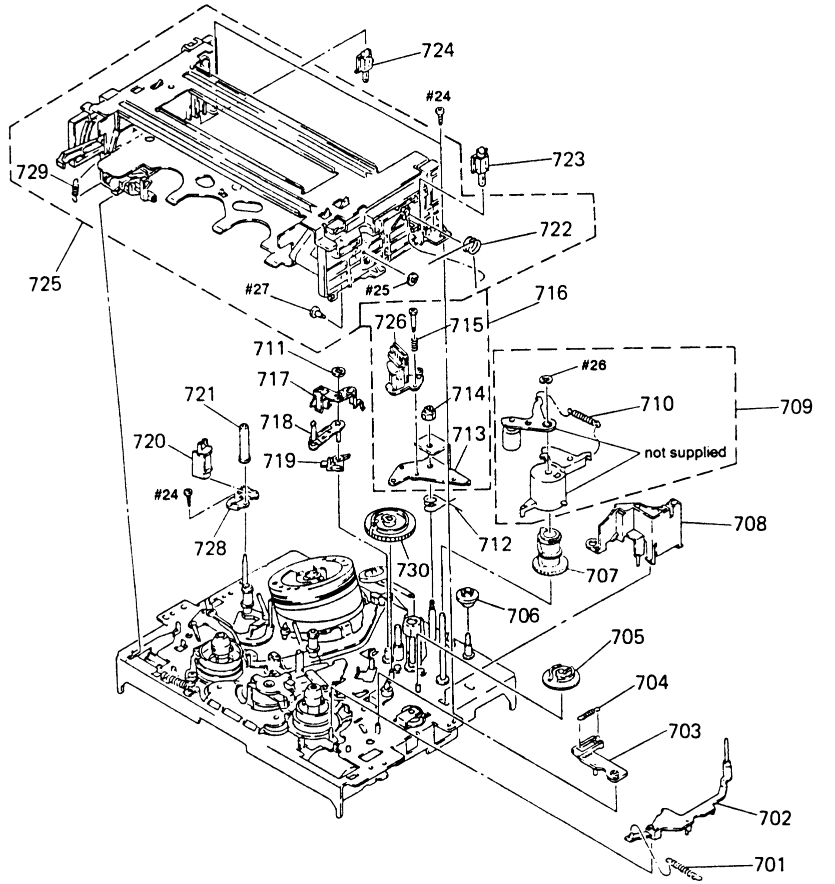
5-1-2. CHASSIS

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.



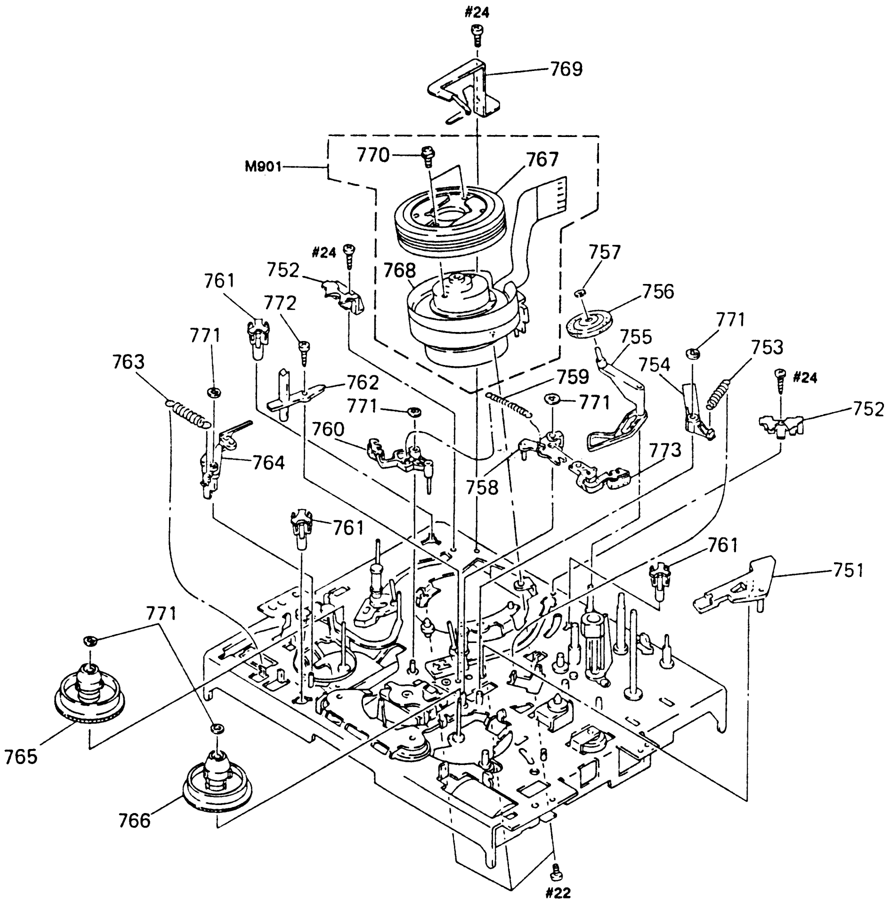
Ref. No.	Part No.	Description	Remark
51	3-959-381-01	BASE (L), MD	
52	3-959-383-01	BASE (R), MD	
53	3-959-382-01	BASE (M), MD	
54	3-959-386-01	HOLDER, POWER	
• 55	3-959-385-51	PANEL, REAR (X500:SG,ME)	
• 55	3-959-385-81	PANEL, REAR (E400EE/X500:IS)	
• 56	A-6722-449-A	PS-338 BOARD, COMPLETE (X500:SG,ME)	
• 56	A-6794-026-A	PS-338 BOARD, COMPLETE (E400EE)	
• 56	A-6794-050-A	PS-338 BOARD, COMPLETE (X500:IS)	
• 57	A-6727-604-A	VI-134 BOARD, COMPLETE (E400EE/X500:IS)	
• 57	A-6727-615-A	VI-134 BOARD, COMPLETE (X500:SG,ME)	
59	3-959-388-01	BASE (L), FL	
• 60	A-6782-368-A	MA-212 BOARD, COMPLETE (E400EE)	
• 60	A-6782-541-A	MA-212 BOARD, COMPLETE (X500:SG,ME)	
• 60	A-6782-545-A	MA-212 BOARD, COMPLETE (X500:IS)	
61	3-959-389-01	BASE (R), FL	
• 62	A-6781-358-A	DM-44 BOARD, COMPLETE (X500:SG,ME)	
• 62	A-6781-369-A	DM-44 BOARD, COMPLETE (E400EE/X500:IS)	
⚠CP101	1-413-896-11	POWER BLOCK (EXCEPT:E400EE)	
⚠CP101	1-413-897-11	POWER BLOCK (E400EE)	

5-1-3. MECHANISM DECK ASSEMBLY (1)



Ref. No.	Part No.	Description	Remark
701	3-958-505-01	SPRING (SOFT BRAKE T), TENSION	
702	X-3943-882-1	BRAKE (T) ASSY, SOFT	
703	X-3943-885-1	ARM ASSY, RVS BRAKE	
704	3-958-462-01	SPRING (RVS BRAKE), TENSION	
705	3-958-153-01	GEAR, PRESS	
706	3-958-501-01	SCREW, ACE ADJUSTMENT	
707	3-958-151-01	GEAR, ELEVATOR	
708	3-958-454-01	OPNER, LID	
709	A-6746-072-A	PRESS BLOCK ASSY, PINCH	
710	3-958-455-01	SPRING (PINCH), TENSION	
711	3-701-438-11	WASHER, 2.5	
712	3-958-487-01	SPRING, (AEC) TORSION COIL	
713	3-958-491-01	BASE, ACE	
714	3-942-867-01	NUT, AC HEIGHT ADJUSTMENT	
715	3-960-439-01	SPRING (ACE), COMPRESSION	
716	A-6736-103-A	ACE BLOCK ASSY	
717	3-962-298-01	BRACKET, TG7 TAPE	
718	X-3944-797-1	TG8 ASSY	
719	3-958-421-01	HOLDER, TG8	
720	1-500-144-11	HEAD, FE	
721	X-3944-460-1	ROLLER ASSY, TG2	
722	3-958-195-01	SPRING, TORSION	
723	3-960-216-01	PLATE, LIGHT GUIDE, TOP SENSOR	
724	3-960-215-01	PLATE, LIGHT GUIDE, END SENSOR	
725	A-6751-496-A	FL BLOCK ASSY	
726	1-506-485-11	PIN, CONNECTOR 6P	
728	3-959-841-01	HOLDER, FEH	
729	3-958-467-01	SPRING, TENSION COIL	
730	3-958-152-01	GEAR, TG8	

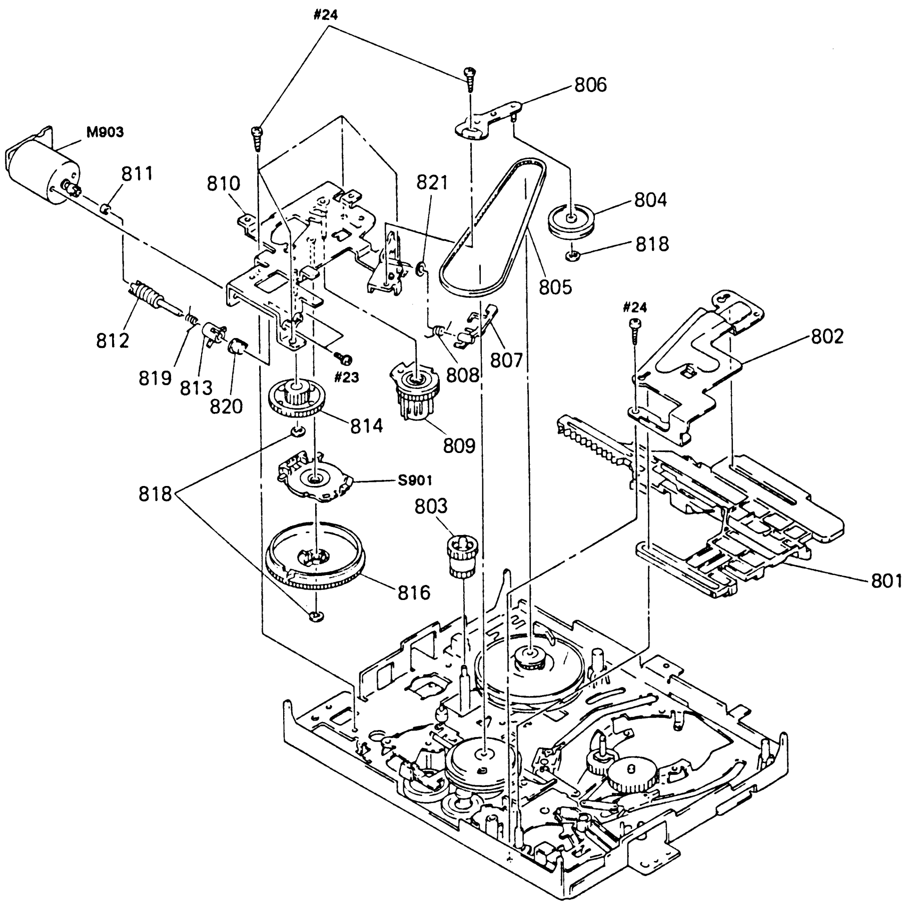
5-1-4. MECHANISM DECK ASSEMBLY (2)


#24
769
M901
770
767
#24
752
761
772
768
757
756
771
755
771
753
763
754
#24
762
759
752
771
771
760
764
758
773
761
761
751
771
765
766
#22

Ref. No.	Part No.	Description	Remark
751	3-960-138-01	ARM, PENDULUM COMPULSION	
752	3-958-389-01	CATCHER	
753	3-958-535-01	SPRING, TENSION	
754	3-960-139-01	ARM, NEUTRALITY	
755	X-3943-896-1	ARM ASSY, HC	
756	X-3944-363-1	ROLLER ASSY, HC	
757	3-321-393-01	WASHER, STOPPER	
758	X-3944-628-1	BRAKE (T) ASSY, MAIN	
759	3-958-517-01	SPRING, TENSIONCOIL	
760	X-3944-599-1	BRAKE (S) ASSY, MAIN	
761	3-958-390-01	SHAFT, PC BOARD	
762	3-958-391-01	PLATE, LIGHT GUIDE, LED	
763	3-958-443-01	SPRING, STRETCH COIL SPRING	
764	3-958-450-01	BRAKE (S), SOFT	
765	X-3943-902-1	TABLE, REEL (S) ASSY	
766	X-3943-903-1	TABLE, REEL (T) ASSY	
767	8-848-621-01	UPPER DRUM ASSY (DZR-54-R)	
768	8-848-637-01	LOWER DRUM ASSY (DZL-47-R)	
769	X-3943-899-1	GROUND ASSY, SHAFT	
770	2-643-205-01	PSW 3X8	
771	3-669-595-00	WASHER (2), STOPPER	
772	3-961-441-01	SCREW (3X8)	
773	X-3944-598-1	CAP ASSY, MAIN BRAKE	
M901	8-848-618-11	DRUM ASSY DZH-54A-R	

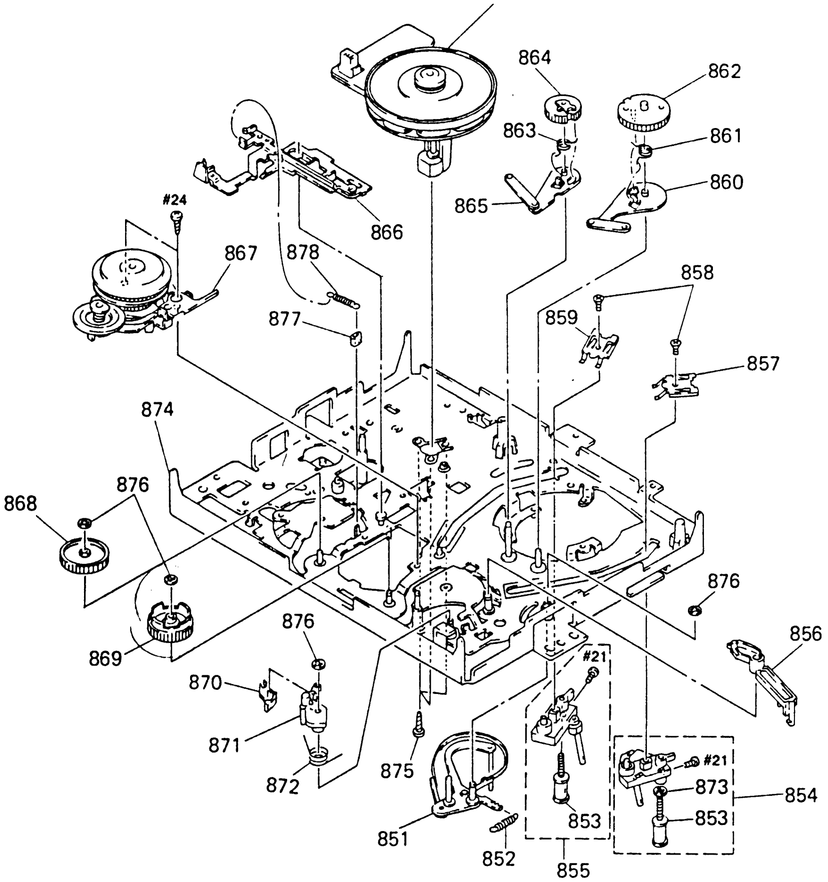
8-848-618-22

5-1-5. MECHANISM DECK ASSEMBLY (3)


#24
806
M903
811
810
821
804
818
805
#24
802
812
819
813
820
#23
808
807
814
809
818
S901
803
816
801

Ref. No.	Part No.	Description	Remark
801	3-958-163-01	SLIDER, MAIN	
* 802	3-959-763-01	RETAINER	
803	3-958-162-01	GEAR, UPPER/LOWER COMMUNICATION	
804	3-958-448-01	WHEEL, TENSION	
805	3-958-361-01	BELT, TIMING	
806	X-3943-889-1	ARM ASSY, TENSION VEHICLE	
807	X-3943-888-1	BRAKE ASSY, CAP	
808	3-958-445-01	SPRING, TORSIONCOIL (CAP BRAKE)	
809	3-958-156-01	GEAR, FL DRIVING	
* 810	X-3943-884-1	CHASSIS ASSY, CAM MOTOR	
811	3-959-840-01	RUBBER, JOINT	
812	3-958-159-01	WORM	
813	3-958-160-01	PROPELLOR	
814	3-958-157-01	WHEEL, WORM	
816	3-958-161-01	GEAR, CAM	
818	3-669-595-00	WASHER (2), STOPPER	
819	3-958-460-01	SPRING, ONE-WAY	
820	3-958-155-01	BEARING, CAM MOTOR	
821	3-701-439-21	WASHER	
M903	X-3943-883-1	MOTOR ASSY, CAM	
S901	1-762-076-11	SWITCH, ROTARY	

5-1-6. MECHANISM DECK ASSEMBLY (4)



Ref. No.	Part No.	Description	Remark
851	X-3943-886-1	TG1 ASSY	
852	3-958-492-01	SPRING (TG1), TENSION COIL	
853	X-3944-378-1	ROLLER ASSY, GUIDE	
854	A-6750-316-A	SHUTTLE (S) BLOCK ASSY	
855	A-6750-314-A	T BLOCK ASSY, SHUTTLE	
856	3-958-504-01	ARM, FIXED RELEASE	
857	3-960-687-01	SPRING, LEAF (S), LOADING	
858	3-960-720-01	SCREW	
859	3-960-688-01	SPRING, LEAF (T), LOADING	
860	X-3943-890-1	LEVER (S) ASSY, LOADING	
861	3-960-448-01	SPRING (S), TORSION COIL	
862	3-958-476-01	GEAR (S), LOADING	
863	3-960-449-01	SPRING (T), TORSION COIL	
864	3-958-485-01	GEAR (T), LOADING	
865	X-3943-891-1	LEVER (T) ASSY, LOADING	
866	X-3943-897-1	LEVER ASSY, TRIGGER	
867	A-6739-102-A	RKB BLOCK ASSY	
868	3-962-960-01	GEAR (T-K), IDLER	
869	3-962-959-01	GEAR (S-K), IDLER	
870	3-958-533-01	CLAW, S WINDING	
871	3-958-532-01	ARM, S WINDING	
872	3-958-534-01	SPRING, TORSION	
873	3-962-874-01	O-RING	
* 874	X-3943-874-1	CHASSIS ASSY, MECHANICAL	
875	3-960-272-01	SCREW (2.6)	
876	3-669-595-00	WASHER (2), STOPPER	
877	3-959-840-01	RUBBER, JOINT	
878	3-958-529-01	SPRING (MOMENT), TENSION	
M902	1-698-409-11	MOTOR, DC (CAPSTAN)	

5-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark
Y*	A-6781-358-A	DM-44 BOARD, COMPLETE (X500:SG, ME)	
*	A-6781-369-A	DM-44 BOARD, COMPLETE (E400EE/X500:IS)	

(Ref. No. 1,000 Series)

< CONNECTOR >

Ref. No.	Part No.	Description
CN801	1-766-713-11	CONNECTOR, BOARD TO BOAR 5P
* CN802	1-766-714-11	CONNECTOR, BOARD TO BOAR 5P

Ref. No.	Part No.	Description
*	A-6782-368-A	MA-212 BOARD, COMPLETE (E400EE)
*	A-6782-541-A	MA-212 BOARD, COMPLETE (X500:SG, ME)
*	A-6782-545-A	MA-212 BOARD, COMPLETE (X500:IS)

(Ref. No. 2,000 Series)

Ref. No.	Part No.	Description
*	3-959-384-01	HOLDER, INDICATION TUBE (X500:SG, ME)
*	3-959-384-11	HOLDER, INDICATION TUBE (E400EE/X500:IS)
*	3-960-273-01	SPACER, TOP END
*	3-960-274-01	SPACER, LED

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C123	1-126-101-11	ELECT	100uF	20%	16V
C124	1-124-477-11	ELECT	47uF	20%	25V
C125	1-124-477-11	ELECT	47uF	20%	25V
C131	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C181	1-124-589-11	ELECT	47uF	20%	16V
C182	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C183	1-124-910-11	ELECT	47uF	20%	50V
C185	1-124-910-11	ELECT	47uF	20%	50V
C187	1-124-589-11	ELECT	47uF	20%	16V
C201	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C202	1-124-589-11	ELECT	47uF	20%	16V
C297	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C301	1-137-431-11	FILM	560PF	5%	50V
C302	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C303	1-104-696-11	FILM	0.015uF	5%	100V
C304	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C305	1-126-101-11	ELECT	100uF	20%	16V
C354	1-124-927-11	ELECT	4.7uF	20%	100V
C355	1-126-233-11	ELECT	22uF	20%	50V
C356	1-126-233-11	ELECT	22uF	20%	50V
C357	1-124-252-00	ELECT	0.33uF	20%	50V
C358	1-124-257-00	ELECT	2.2uF	20%	50V
C359	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C360	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C361	1-163-143-00	CERAMIC CHIP	0.0012uF	5%	50V
C362	1-163 014 00	CERAMIC CHIP	0.0027uF	5%	50V
C363	1-126-962-11	ELECT	3.3uF	20%	50V
C364	1-124-927-11	ELECT	4.7uF	20%	100V
C365	1-137-370-11	FILM	0.01uF	5%	50V
C366	1-164-159-11	CERAMIC	0.1uF		50V
C367	1-124-903-11	ELECT	1uF	20%	50V
C368	1-164-159-11	CERAMIC	0.1uF		50V
C369	1-164-159-11	CERAMIC	0.1uF		50V
C402	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C403	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C404	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C405	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C406	1-126-157-11	ELECT	10uF	20%	16V
C407	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C408	1-124-589-11	ELECT	47uF	20%	16V
C410	1-126-233-11	ELECT	22uF	20%	50V
C411	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C412	1-130-488-00	MYLAR	0.027uF	5%	50V
C413	1-130-489-00	MYLAR	0.033uF	5%	50V
C415	1-126-176-11	ELECT	220uF	20%	10V
C416	1-124-126-00	ELECT	47uF	20%	10V
C417	1-124-126-00	ELECT	47uF	20%	10V
C418	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C419	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C420	1-124-443-00	ELECT	100uF	20%	10V
C421	1-126-233-11	ELECT	22uF	20%	50V
C422	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C423	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C425	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C426	1-124-925-11	ELECT	2.2uF	20%	100V

Ref. No.	Part No.	Description			Remark
C429	1-124-925-11	ELECT	2.2uF	20%	100V
C431	1-124-589-11	ELECT	47uF	20%	16V
C432	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C433	1-163-077-00	CERAMIC CHIP	0.1uF		50V
C434	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C440	1-124-907-11	ELECT	10uF	20%	50V
C441	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C442	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C443	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C486	1-124-589-11	ELECT	47uF	20%	16V
C488	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C489	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C501	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C502	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C503	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C505	1-124-584-00	ELECT	100uF	20%	10V
C506	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C507	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C508	1-104-905-11	CAP. DOUBLE LAYERS	0.22F		
C509	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C510	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C511	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C512	1-124-472-11	ELECT	470uF	20%	10V
C514	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C519	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C520	1-124-126-00	ELECT	47uF	20%	10V
C524	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C591	1-124-589-11	ELECT	47uF	20%	16V
C592	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C601	1-124-589-11	ELECT	47uF	20%	16V
C602	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C609	1-124-589-11	ELECT	47uF	20%	16V
C610	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C615	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C616	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C617	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C618	1-124-254-00	ELECT	0.68uF	20%	50V
C620	1-130-481-00	MYLAR	0.0068uF	5%	50V
C621	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C622	1-130-487-00	MYLAR	0.022uF	5%	50V
C623	1-124-465-00	ELECT	0.47uF	20%	50V
C624	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C625	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C627	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C631	1-163-234-11	CERAMIC CHIP	20PF	5%	50V
C632	1-163-234-11	CERAMIC CHIP	20PF	5%	50V
C703	1-124-126-00	ELECT	47uF	20%	10V
C705	1-124-126-00	ELECT	47uF	20%	10V
C706	1-126-163-11	ELECT	4.7uF	20%	50V

Ref. No.	Part No.	Description			Remark
C707	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C709	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C710	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C711	1-126-101-11	ELECT	100uF	20%	16V
C722	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C725	1-124-472-11	ELECT	470uF	20%	10V
C726	1-126-233-11	ELECT	22uF	20%	50V
C732	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C801	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C852	1-124-638-11	ELECT	22uF	20%	10V
C853	1-124-126-00	ELECT	47uF	20%	10V
C854	1-126-233-11	ELECT	22uF	20%	50V

< FILTER >

CF201	1-577-101-11	VIBRATOR, CERAMIC

< CONNECTOR >

• CN110	1-766-694-11	CONNECTOR, BOARD TO BOARD 6P
• CN201	1-564-007-11	PIN, CONNECTOR 8P
• CN302	1-560-892-00	PIN, CONNECTOR 4P
• CN303	1-560-891-00	PIN, CONNECTOR 3P
• CN407	1-560-891-00	PIN, CONNECTOR 3P
• CN410	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P
• CN411	1-766-717-11	CONNECTOR, BOARD TO BOARD 5P
• CN413	1-766-538-11	CONNECTOR, BOARD TO BOARD 8P
• CN415	1-766-537-11	CONNECTOR (IMD) 5P
CN801	1-573-844-11	CONNECTOR, BOARD TO BOARD 12P
CN802	1-766-718-11	CONNECTOR, BOARD TO BOARD 17P

< JACK >

CNJ01	1-568-185-21	JACK, PIN 4P (LINE IN/OUT)

< COMPOSITION CIRCUIT BLOCK >

• ⚠CP181	1-467-811-11	UNIT, DC-DC CONVERTER

< TRIMMER >

CT601	1-141-334-11	CAP, VAR, TRIMMER

< DIODE >

⚠D121	8-719-200-82	DIODE	11ES2
D122	8-719-109-85	DIODE	RD5.1ES-B2
D123	8-719-911-19	DIODE	1SS119
D202	8-719-911-19	DIODE	1SS119
D206	8-719-911-19	DIODE	1SS119
D208	8-719-911-19	DIODE	1SS119
D209	8-719-911-19	DIODE	1SS119

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description		Remark
D210	8-719-911-19	DIODE	1SS119	
D211	8-719-101-73	DIODE	RD9.1E-L2	
D212	8-719-110-08	DIODE	RD8.2ES-B2	
D213	8-719-050-12	DIODE	MPG5304S	
D215	8-719-911-19	DIODE	1SS119	
D217	8-719-050-12	DIODE	MPG5304S	
D219	8-719-104-34	DIODE	1S2836	
D304	8-719-911-19	DIODE	1SS119	
D401	8-719-911-19	DIODE	1SS119	
D402	8-719-101-50	DIODE	RD5.1E-L2	
D405	8-719-109-93	DIODE	RD6.2ES-B2	
D406	8-719-109-93	DIODE	RD6.2ES-B2	
D407	8-719-048-26	DIODE	GL528V1	
D408	8-719-101-47	DIODE	RD4.7E-L2	
D410	8-719-110-14	DIODE	RD9.1ES-B3	
D501	8-719-911-19	DIODE	1SS119	
⚠D502	8-719-200-82	DIODE	11ES2	
⚠D503	8-719-200-82	DIODE	11ES2	
D603	8-719-911-19	DIODE	1SS119	
⚠D703	8-719-800-76	DIODE	1SS226	
⚠D704	8-719-110-78	DIODE	RD33ES-B2	
D705	8-719-109-81	DIODE	RD4.7ES-B2	
D706	8-719-109-81	DIODE	RD4.7ES-B2	
D709	8-719-109-81	DIODE	RD4.7ES-B2	
D716	8-719-109-96	DIODE	RD6.8ES-B1	

< FILTER >

FL201	1-517-343-11	TUBE, FLUORESCENT INDICATOR

< IC >

⚠IC121	8-759-189-48	IC	PQ12RE11
IC201	8-759-290-71	IC	uPD75212AGF-587-3BE
IC291	1-466-833-21	IC	RAY-CATCHER BLOCK, REMOCON
IC301	8-759-268-02	IC	BA7796FS-E2
IC403	8-759-702-02	IC	NJM062M
IC406	8-759-246-14	IC	TA8823N
IC407	8-759-100-95	IC	uPC324G2
⚠IC410	8-759-294-26	IC	BA6209-V2
* IC501	8-752-865-~~35~~	~~IC~~	CXP87248-063Q
IC504	8-759-278-57	IC	AK6420~~HF-E2~~
IC507	8-759-248-87	IC	MM1256XF-BE
IC601	8-759-261-79	IC	LC74790M-9057-TLM
IC801	8-759-927-56	IC	BA7021

875286
862

< JUMPER RESISTOR >

JR704	1-216-295-00	CONDUCTOR, CHIP (2012)
JR705	1-216-295-00	CONDUCTOR, CHIP (2012)
JR706	1-216-295-00	CONDUCTOR, CHIP (2012)

Ref. No.	Part No.	Description	Remark
JR914	1-216-295-00	CONDUCTOR, CHIP (2012)	
JR922	1-216-295-00	CONDUCTOR, CHIP (2012)	

< JUMPER RESISTOR >

JW906	1-410-500-11	INDUCTOR 1.8UH

< COIL >

L181	1-408-970-21	INDUCTOR 10uH
L182	1-410-526-11	INDUCTOR 10uH
L183	1-410-526-11	INDUCTOR 10uH
L210	1-408-982-21	INDUCTOR 100uH
L301	1-410-687-11	INDUCTOR 1.2mH
L304	1-414-183-41	INDUCTOR 10uH
L401	1-408-974-21	INDUCTOR 22uH
L403	1-408-982-21	INDUCTOR 100uH
L501	1-414-183-41	INDUCTOR 10uH
L503	1-414-183-41	INDUCTOR 10uH
⚠L505	1-414-179-21	INDUCTOR 2.2uH
L601	1-414-189-31	INDUCTOR 100uH
L602	1-414-189-31	INDUCTOR 100uH
L603	1-410-513-11	INDUCTOR 22uH
L604	1-410-506-11	INDUCTOR 5.6uH
L701	1-414-183-41	INDUCTOR 10uH
L702	1-414-186-31	INDUCTOR 33uH
L706	1-408-401-00	INDUCTOR 2.2uH
L707	1-408-401-00	INDUCTOR 2.2uH
L708	1-408-982-21	INDUCTOR 100uH
L801	1-408-982-21	INDUCTOR 100uH

< PHOTO INTERRUPTER >

PH401	8-749-010-19	PHOTO INTERRUPTER GP3S113
PH402	8-749-010-20	PHOTO INTERRUPTER GP3S114

< IC LINK >

⚠PS121	1-532-675-00	LINK, IC 1.5A
⚠PS181	1-532-679-00	LINK, IC 0.6A
⚠PS301	1-532-727-11	LINK, IC 0.25A
⚠PS401	1-532-637-00	LINK, IC 1.0A
⚠PS402	1-532-727-11	LINK, IC 0.25A

< TRANSISTOR >

⚠Q121	8-729-140-93	TRANSISTOR	2SB733-34
Q122	8-729-421-22	TRANSISTOR	UN2211
⚠Q123	8-729-140-98	TRANSISTOR	2SD773
Q125	8-729-025-92	PHOTO TRANSISTOR	PT380F
Q126	8-729-025-92	PHOTO TRANSISTOR	PT380F
Q127	8-729-281-53	TRANSISTOR	2SC1815-GR
Q202	8-729-421-22	TRANSISTOR	UN2211

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
Q301	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q	
Q302	8-729-900-51	TRANSISTOR DTA114TK	
Q303	8-729-010-25	TRANSISTOR MSD601-RT1	
Q304	8-729-010-05	TRANSISTOR MSB709-RT1	
Q305	8-729-010-25	TRANSISTOR MSD601-RT1	
Q501	8-729-901-06	TRANSISTOR DTA144EK	
Q504	8-729-901-06	TRANSISTOR DTA144EK	
Q604	8-729-010-05	TRANSISTOR MSB709-RT1	
Q605	8-729-010-05	TRANSISTOR MSB709-RT1	
⚠Q703	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q712	8-729-119-76	TRANSISTOR 2SA1175-HFE	

‹ RESISTOR ›

Ref. No.	Part No.	Description	Remark
R121	1-249-417-11	CARBON 1K 5% 1/4W	F
⚠R122	1-216-430-11	METAL OXIDE 390 5% 1W	F
R123	1-249-412-11	CARBON 390 5% 1/4W	F
R124	1-216-295-00	CONDUCTOR, CHIP (2012)	
⚠R125	1-215-881-11	METAL OXIDE 15 5% 2W	F
R126	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R209	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R210	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R211	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R212	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R217	1-216-025-00	METAL CHIP 100 5% 1/10W	
R218	1-216-025-00	METAL CHIP 100 5% 1/10W	
R219	1-216-025-00	METAL CHIP 100 5% 1/10W	
R220	1-216-025-00	METAL CHIP 100 5% 1/10W	
R221	1-216-025-00	METAL CHIP 100 5% 1/10W	
R222	1-216-025-00	METAL CHIP 100 5% 1/10W	
R223	1-216-025-00	METAL CHIP 100 5% 1/10W	
R224	1-216-025-00	METAL CHIP 100 5% 1/10W	
R225	1-216-025-00	METAL CHIP 100 5% 1/10W	
R226	1-216-025-00	METAL CHIP 100 5% 1/10W	
R227	1-216-025-00	METAL CHIP 100 5% 1/10W	
R228	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R229	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R230	1-216-031-00	METAL CHIP 180 5% 1/10W	
R232	1-216-025-00	METAL CHIP 100 5% 1/10W	
R233	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R234	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R235	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R238	1-216-031-00	METAL CHIP 180 5% 1/10W	
R282	1-249-429-11	CARBON 10K 5% 1/4W	
R302	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R332	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R333	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R334	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R335	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R336	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R337	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R363	1-216-001-00	METAL CHIP 10 5% 1/10W	
R370	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R371	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R372	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R373	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R374	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R375	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R376	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R378	1-216-041-00	METAL CHIP 470 5% 1/10W	
R379	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R380	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R381	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	
R382	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R383	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R384	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R385	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R387	1-216-304-11	METAL CHIP 3.3 5% 1/10W	
R388	1-216-295-00	CONDUCTOR, CHIP (2012)	
R389	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R390	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R391	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R401	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R402	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R403	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R404	1-216-031-00	METAL CHIP 180 5% 1/10W	
R405	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R406	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R407	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R408	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R409	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R410	1-216-056-00	METAL GLAZE 2K 5% 1/10W	
R411	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R412	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R413	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R414	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R415	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R416	1-216-103-00	METAL GLAZE 180K 5% 1/10W	
R417	1-216-079-00	METAL CHIP 18K 5% 1/10W	
R418	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R419	1-249-436-11	CARBON 39K 5% 1/4W	
R420	1-208-782-11	METAL GLAZE 1K 0.50% 1/10W	
R421	1-208-790-11	METAL GLAZE 2.2K 0.50% 1/10W	
R422	1-208-790-11	METAL GLAZE 2.2K 0.50% 1/10W	
R430	1-249-400-11	CARBON 39 5% 1/4W	F
R431	1-249-400-11	CARBON 39 5% 1/4W	F
R432	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R433	1-216-068-00	METAL CHIP 6.2K 5% 1/10W	
R435	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R436	1-216-119-00	METAL CHIP 820K 5% 1/10W	
R437	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R438	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R439	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R440	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R441	1-216-037-00	METAL CHIP 330 5% 1/10W	
R443	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R445	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R446	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R449	1-216-101-00	METAL CHIP 150K 5% 1/10W	
R450	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R451	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R453	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R455	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R456	1-216-041-00	METAL CHIP 470 5% 1/10W	
R458	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R459	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R460	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R461	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R470	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R471	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R481	1-216-295-00	CONDUCTOR, CHIP (2012)	
R482	1-216-295-00	CONDUCTOR, CHIP (2012)	
R501	1-216-017-00	METAL CHIP 47 5% 1/10W	
R502	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R505	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R506	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R507	1-216-033-00	METAL CHIP 220 5% 1/10W	
R508	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R509	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R510	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R511	1-216-025-00	METAL CHIP 100 5% 1/10W	
R512	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R513	1-216-025-00	METAL CHIP 100 5% 1/10W	
R517	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R518	1-216-079-00	METAL CHIP 18K 5% 1/10W	(X500)
R518	1-216-083-00	METAL CHIP 27K 5% 1/10W	(E400EE)
R521	1-216-001-00	METAL CHIP 10 5% 1/10W	
R522	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R523	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R524	1-247-887-00	CARBON 220K 5% 1/4W	
R525	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R538	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R539	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R546	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R547	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R550	1-216-295-00	CONDUCTOR, CHIP (2012)	
R551	1-216-295-00	CONDUCTOR, CHIP (2012)	
R552	1-216-295-00	CONDUCTOR, CHIP (2012)	
R553	1-216-295-00	CONDUCTOR, CHIP (2012)	
R554	1-216-295-00	CONDUCTOR, CHIP (2012)	
R560	1-249-436-11	CARBON 39K 5% 1/4W	
R561	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R562	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R590	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R591	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R592	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R593	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R594	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R595	1-249-423-11	CARBON 3.3K 5% 1/4W	F
R596	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R597	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R598	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R599	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R613	1-216-295-00	CONDUCTOR, CHIP (2012)	
R614	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R615	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R616	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R617	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R618	1-216-045-00	METAL CHIP 680 5% 1/10W	
R619	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R620	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R621	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R622	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R623	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R625	1-216-295-00	CONDUCTOR, CHIP (2012)	
R704	1-216-025-00	METAL CHIP 100 5% 1/10W	
R705	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R719	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R730	1-215-393-00	METAL 68 1% 1/6W	
R731	1-247-811-31	CARBON 150 5% 1/4W	
R732	1-216-037-00	METAL CHIP 330 5% 1/10W	
R733	1-247-812-11	CARBON 160 5% 1/4W	
R735	1-216-023-00	METAL CHIP 82 5% 1/10W	
R738	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R741	1-216-295-00	CONDUCTOR, CHIP (2012)	
R801	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R802	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R804	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R805	1-216-295-00	CONDUCTOR, CHIP (2012)	
R806	1-216-295-00	CONDUCTOR, CHIP (2012)	

‹ COMPOSITION CIRCUIT BLOCK ›

Ref. No.	Part No.	Description	Remark
RB201	1-219-386-11	NETWORK, RESISTOR (CHIP TYPE)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-212 **PS-338** **VI-134**

Ref. No.	Part No.	Description		Remark	
		< VARIABLE RESISTOR >			
RV301	1-238-019-11	RES, ADJ, CARBON 47K			
RV502	1-238-019-11	RES, ADJ, CARBON 47K			
		< SWITCH >			
S201	1-571-532-32	SWITCH, TACTIL (ON/STANDBY)			
S202	1-571-532-32	SWITCH, TACTIL (EJECT)			
S203	1-571-532-32	SWITCH, TACTIL (PROGRAM:+)			
S204	1-571-532-32	SWITCH, TACTIL (PROGRAM:-)			
S206	1-571-532-32	SWITCH, TACTIL (PAUSE)			
S207	1-571-532-32	SWITCH, TACTIL (REC)			
S215	1-572-907-11	SWITCH, SLIDE (COLOR SYSTEM)			
S216	1-572-984-21	SWITCH, SLIDE (NTSC PB)			
S401	1-570-953-11	SWITCH, PUSH (1 KEY) (REC PROOF, CASSETTE IN)			
		< SWITCH >			
SW701	1-571-588-11	SWITCH, SLIDE (TV SYSTEM)			
		< TRANSFORMER >			
T301	1-423-414-11	TRANSFORMER, BIAS OSCILLATION			
		< TUNER >			
⚠TU701	1-693-239-11	TUNER, RF MOD/IF			
		< VIBRATOR >			
X501	1-760-494-11	VIBRATOR, CRYSTAL 16MHz			
X502	1-579-463-11	VIBRATOR, CRYSTAL 32.768KHz			
X602	1-577-289-11	VIBRATOR, CRYSTAL 17.734MHz			

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• A-6722-449-A PS-338 BOARD, COMPLETE (X500:SG,ME)

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• A-6794-026-A PS-338 BOARD, COMPLETE (E400EE)

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• A-6794-050-A PS-338 BOARD, COMPLETE (X500:IS)

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(Ref. No. 3,000 Series)

Ref. No.	Part No.	Description		Remark	
	1-533-293-11	FUSE HOLDER (E400EE/X500:IS)			
		< CAPACITOR >			
⚠C101	1-104-705-11	FILM	0.1uF	20%	250V (X500)
⚠C101	1-104-706-11	FILM	0.22uF	20%	250V (E400EE)
⚠C102	1-104-705-11	FILM	0.1uF	20%	250V
⚠C103	1-107-405-11	ELECT	68uF	20%	400V (E400EE)
⚠C103	1-125-497-11	ELECT(BLOCK)	100uF	20%	400V (X500)
⚠C104	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C105	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C106	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C107	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C108	1-161-741-00	CERAMIC	0.001uF	10%	400V
C121	1-124-480-11	ELECT	470uF	20%	25V
C122	1-124-472-11	ELECT	470uF	20%	10V
		< CONNECTOR >			
⚠CN101	1-251-134-11	INLET, AC (NONPOLAR)			
CN102	1-766-919-11	SOCKET, CONNECTOR (PC BOARD) 6P			
		< COMPOSITION CIRCUIT BLOCK >			
⚠CP101	1-413-896-11	POWER BLOCK (X500)			
⚠CP101	1-413-897-11	POWER BLOCK (E400EE)			
		< DIODE >			
⚠D101	8-719-510-06	DIODE S1WB60			
		< FUSE >			
⚠F101	1-576-228-11	FUSE (H.B.C.) T2A 250V			
		< COIL >			
⚠L121	1-403-588-11	CIL, CHOKE 22uH			
⚠L122	1-403-588-11	CIL, CHOKE 22uH			
		< LINE FILTER >			
⚠LF101	1-403-599-11	FILTER, LINE 33MH (E400EE)			
⚠LF101	1-424-117-11	FILTER, LINE (X500)			
⚠LF102	1-403-599-11	FILTER, LINE 33MH (E400EE)			
⚠LF102	1-424-117-11	FILTER, LINE (X500)			
		< RESISTOR >			
⚠R101	1-214-947-00	METAL	2.7M	1%	1/2W

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• A-6727-604-A VI-134 BOARD, COMPLETE (E400EE/X500:IS)

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• A-6727-615-A VI-134 BOARD, COMPLETE (X500:SG,ME)

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(Ref. No. 1,000 Series)

The components identified by
mark ⚠ or dotted line with mark
⚠ are critical for safety.
Replace only with part number
specified.

Ref. No.	Part No.	Description		Remark	
		< CAPACITOR >			
C001	1-162-219-31	CERAMIC	68PF	5%	50V
C002	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C003	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C004	1-124-126-00	ELECT	47uF	20%	10V
C005	1-124-126-00	ELECT	47uF	20%	10V
C006	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C007	1-124-927-11	ELECT	4.7uF	20%	100V
C008	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C101	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C109	1-124-126-00	ELECT	47uF	20%	10V
C110	1-124-126-00	ELECT	47uF	20%	10V
C111	1-124-907-11	ELECT	10uF	20%	50V
C112	1-124-126-00	ELECT	47uF	20%	10V
C113	1-124-126-00	ELECT	47uF	20%	10V
C115	1-124-126-00	ELECT	47uF	20%	10V
C116	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C501	1-124-126-00	ELECT	47uF	20%	10V
C502	1-162-306-11	CERAMIC	0.01uF	30%	16V
C503	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C504	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C506	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C601	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C603	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C604	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C605	1-124-126-00	ELECT	47uF	20%	10V
C606	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C801	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C802	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C803	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C804	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C805	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C806	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C807	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C808	1-124-584-00	ELECT	100uF	20%	10V
C809	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C810	1-124-584-00	ELECT	100uF	20%	10V
C811	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C813	1-164-336-11	CERAMIC CHIP	0.33uF		25V
C814	1-164-159-11	CERAMIC	0.1uF		50V
C815	1-164-159-11	CERAMIC	0.1uF		50V
C816	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C817	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C822	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C826	1-124-229-00	ELECT	33uF	20%	10V
C827	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C829	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C830	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C836	1-126-160-11	ELECT	1uF	20%	50V
C838	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C839	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C840	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C841	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C901	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C902	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C903	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C904	1-163-090-00	CERAMIC CHIP	7PF		50V
C905	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C906	1-163-112-00	CERAMIC CHIP	62PF	5%	50V
C907	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C921	1-124-126-00	ELECT	47uF	20%	10V
C922	1-163-031-11	CERAMIC CHIP	0.01uF		50V
		< FILTER >			
CF001	1-527-943-00	FILTER, CERAMIC			
		< CONNECTOR >			
CN001	1-573-826-11	CONNECTOR, BOARD TO BOARD 12P			
CN002	1-766-720-11	CONNECTOR, BOARD TO BOARD 17P			
CN801	1-563-585-11	CONNECTOR, FLEXIBLE 8P			
• CN802	1-564-029-00	PIN, CONNECTOR 4P			
		< DIODE >			
D103	8-719-911-19	DIODE 1SS119			
D801	8-719-911-19	DIODE 1SS119			
D802	8-719-911-19	DIODE 1SS119			
D803	8-719-911-19	DIODE 1SS119			
D804	8-719-911-19	DIODE 1SS119			
		< IC >			
IC001	8-759-996-63	IC BA7025L			
IC101	1-467-887-21	IC YC MODULE 2 (PAL) JFA1118			
IC801	8-759-267-78	IC HA118191ANT			
		< JUMPER RESISTOR >			
JR001	1-216-296-00	METAL CHIP	0	5%	1/8W
JR002	1-216-296-00	METAL CHIP	0	5%	1/8W
JR003	1-216-296-00	METAL CHIP	0	5%	1/8W
JR004	1-216-296-00	METAL CHIP	0	5%	1/8W
JR005	1-216-295-00	CONDUCTOR, CHIP (2012)			
JR006	1-216-295-00	CONDUCTOR, CHIP (2012)			
JR007	1-216-295-00	CONDUCTOR, CHIP (2012)			
JR008	1-216-296-00	METAL CHIP	0	5%	1/8W
JR009	1-216-296-00	METAL CHIP	0	5%	1/8W
JR010	1-216-296-00	METAL CHIP	0	5%	1/8W
JR011	1-216-296-00	METAL CHIP	0	5%	1/8W
JR012	1-216-296-00	METAL CHIP	0	5%	1/8W

Ref. No.	Part No.	Description	Remark
JR013	1-216-295-00	CONDUCTOR, CHIP (2012)	
JR014	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR015	1-216-295-00	CONDUCTOR, CHIP (2012)	

< COIL >

Ref. No.	Part No.	Description	Remark
L001	1-414-189-31	INDUCTOR 100uH	
L103	1-414-189-31	INDUCTOR 100uH	
L104	1-408-982-21	INDUCTOR 100uH	
L105	1-408-982-21	INDUCTOR 100uH	
L106	1-414-189-31	INDUCTOR 100uH	
L501	1-408-948-00	INDUCTOR 220uH	
L502	1-408-982-21	INDUCTOR 100uH	
L601	1-414-189-31	INDUCTOR 100uH	
L801	1-410-525-11	INDUCTOR 220uH	
L802	1-410-525-11	INDUCTOR 220uH	
L803	1-414-189-31	INDUCTOR 100uH	
L804	1-414-189-31	INDUCTOR 100uH	
L810	1-410-524-41	INDUCTOR 180uH	
L812	1-414-189-31	INDUCTOR 100uH	
L901	1-410-511-11	INDUCTOR 15uH	
L902	1-410-511-11	INDUCTOR 15uH	
L903	1-408-982-21	INDUCTOR 100uH	
L905	1-410-515-11	INDUCTOR 33uH	
L906	1-410-509-11	INDUCTOR 10uH	
L907	1-410-516-11	INDUCTOR 39uH	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q001	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q105	8-729-901-06	TRANSISTOR DTA144EK	
Q106	8-729-421-19	TRANSISTOR UN2213	
Q108	8-729-901-06	TRANSISTOR DTA144EK	
Q351	8-729-421-19	TRANSISTOR UN2213	
Q501	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q601	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q602	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q603	8-729-901-01	TRANSISTOR DTC144EK	
Q604	8-729-901-01	TRANSISTOR DTC144EK	
Q831	8-729-901-01	TRANSISTOR DTC144EK	
Q841	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q842	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q851	8-729-901-01	TRANSISTOR DTC144EK	
Q852	8-729-901-01	TRANSISTOR DTC144EK	
⚠Q853	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q854	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q855	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q861	8-729-216-21	TRANSISTOR 2SA1162Y-TE85L	
Q862	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q901	8-729-216-21	TRANSISTOR 2SA1162Y-TE85L	
Q902	8-729-901-01	TRANSISTOR DTC144EK	
Q903	8-729-901-01	TRANSISTOR DTC144EK	
Q904	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q905	8-729-901-01	TRANSISTOR DTC144EK	
Q906	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q907	8-729-901-01	TRANSISTOR DTC144EK	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R001	1-247-863-00	CARBON 22K 5% 1/4W	
R002	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R003	1-249-421-11	CARBON 2.2K 5% 1/4W	F
R004	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R005	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R006	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R007	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R101	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R102	1-208-798-11	METAL GLAZE 4.7K 0.50% 1/10W	
R103	1-216-295-00	CONDUCTOR, CHIP (2012)	
R107	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R110	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R112	1-216-092-00	METAL GLAZE 62K 5% 1/10W	
R116	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R117	1-216-079-00	METAL CHIP 18K 5% 1/10W	
R122	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R127	1-216-295-00	CONDUCTOR, CHIP (2012)	
R130	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R131	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R134	1-216-025-00	METAL CHIP 100 5% 1/10W	
R353	1-249-417-11	CARBON 1K 5% 1/4W	F
R501	1-216-045-00	METAL CHIP 680 5% 1/10W	
R502	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R503	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R504	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R505	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R506	1-216-047-00	METAL CHIP 820 5% 1/10W	
R601	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R602	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R603	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	
R604	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R605	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R606	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R607	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R801	1-216-025-00	METAL CHIP 100 5% 1/10W	
R802	1-216-037-00	METAL CHIP 330 5% 1/10W	
R805	1-211-955-11	METAL GLAZE 13 0.50% 1/10W	
R806	1-216-025-00	METAL CHIP 100 5% 1/10W	
R807	1-216-025-00	METAL CHIP 100 5% 1/10W	
R811	1-216-037-00	METAL CHIP 330 5% 1/10W	
R812	1-216-025-00	METAL CHIP 100 5% 1/10W	
R821	1-216-041-00	METAL CHIP 470 5% 1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
R823	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R835	1-216-048-00	METAL CHIP 910 5% 1/10W	
R836	1-247-836-11	CARBON 1.6K 5% 1/4W	
R840	1-208-758-11	METAL GLAZE 100 0.50% 1/10W	
R841	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R842	1-208-750-11	METAL GLAZE 47 0.50% 1/10W	
R843	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R851	1-249-423-11	CARBON 3.3K 5% 1/4W	F
R852	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R853	1-216-079-00	METAL CHIP 18K 5% 1/10W	
R856	1-247-807-31	CARBON 100 5% 1/4W	
R858	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R859	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R861	1-249-419-11	CARBON 1.5K 5% 1/4W	F
R862	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R863	1-216-047-00	METAL CHIP 820 5% 1/10W	
R864	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R865	1-249-417-11	CARBON 1K 5% 1/4W	F
R866	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R901	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R902	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R903	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R904	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R905	1-216-039-00	METAL CHIP 390 5% 1/10W	
R906	1-216-047-00	METAL CHIP 820 5% 1/10W	
R907	1-216-045-00	METAL CHIP 680 5% 1/10W	
R908	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R909	1-249-417-11	CARBON 1K 5% 1/4W	F
R910	1-216-041-00	METAL CHIP 470 5% 1/10W	
R911	1-216-046-00	METAL CHIP 750 5% 1/10W	
R912	1-249-421-11	CARBON 2.2K 5% 1/4W	F
R913	1-216-037-00	METAL CHIP 330 5% 1/10W	
R914	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R915	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R916	1-249-429-11	CARBON 10K 5% 1/4W	
R917	1-216-039-00	METAL CHIP 390 5% 1/10W	

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description	Remark
RV001	1-241-760-11	RES, ADJ, CARBON 470	

< TRANSFORMER >

Ref. No.	Part No.	Description	Remark
T001	1-409-467-11	COIL (TRAP 7.8K)	

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MISCELLANEOUS

Ref. No.	Part No.	Description	Remark
716	A-6736-103-A	ACE BLOCK ASSY	
720	1-500-144-11	HEAD, FE	
726	1-506-485-11	PIN, CONNECTOR 6P	
767	8-848-621-01	UPPER DRUM ASSY (DZR-54-R)	
768	8-848-637-01	LOWER DRUM ASSY (DZL-47-R)	
M901	8-848-618-11	DRUM ASSY DZH-54A-R	
M902	1-698-409-11	MOTOR, DC (CAPSTAN)	
M903	X-3943-883-1	MOTOR ASSY, CAM	
S1	1-572-662-71	SWITCH, ROTARY	
S901	1-762-076-11	SWITCH, ROTARY	

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ACCESSORIES & PACKING MATERIALS

Ref. No.	Part No.	Description
⚠	1-569-008-11	ADAPTER, CONVERSION 2P (X500:SG, ME)
⚠	1-575-131-11	CORD, POWER
	1-696-593-11	CORD, CONNECTION (PAL) 1.5m (AERIAL)
◆	3-701-634-00	BAG, POLYETHYLENE (E400EE/X500:IS)
	3-759-702-11	MANUAL, INSTRUCTION (ENGLISH) (X500:SG, ME)
	3-759-702-61	MANUAL, INSTRUCTION (ARABIC) (X500:SG, ME)
	3-759-702-81	MANUAL, INSTRUCTION (ENGLISH, CZECK, POLISH, RUSSIAN) (E400EE/X500:IS)
	3-759-702-91	MANUAL, INSTRUCTION (E400EE)
◆	3-961-424-01	CUSHION (UPPER) (X500:SG, ME)
◆	3-961-425-01	CUSHION (LOWER) (X500:SG, ME)
◆	3-961-581-01	SHEET, PROTECTION (X500:SG, ME)
◆	3-961-892-01	CUSHION (UPPER) (E400EE/X500:IS)
◆	3-961-893-01	CUSHION (LOWER) (E400EE/X500:IS)
◆	3-961-894-02	INDIVIDUAL CARTON (E400EE)
◆	3-962-151-01	INDIVIDUAL CARTON (X500:SG, ME)
◆	3-962-837-01	INDIVIDUAL CARTON (X500:IS)

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HARDWARE LIST

Ref. No.	Part No.	Description
#1	7-685-647-79	SCREW +BVTP 3X10 TYPE2
#2	7-685-648-79	SCREW +BVTP 3X12 TYPE2
#21	7-621-255-15	SCREW +B 2X3
#22	7-682-547-04	SCREW +P 3X6
#23	7-682-645-01	SCREW +PS 3X4
#24	7-685-646-79	SCREW (3X8)
#25	7-624-190-61	STOP RING 2.4, TYPE-CS
#26	7-624-106-04	STOP RING 3.0, TYPE -E
#27	7-685-903-21	SCREW +PTPWH 3X8 (TYPE2)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 6
INTERFACE, IC PIN FUNCTION DESCRIPTION

6-1. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOAD-ING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	REC
CW	MA-212 Board IC501 (91)	O	L	H	L	H	L	L	L	L	L	L
CAM	MA-212 Board IC501 (92)	O	L	L	L	H	L	L	L	L	L	L
MODE 1	MA-212 Board IC501 (58)	I	L	L	L	H	H	H	H	H	H	H
MODE 2	MA-212 Board IC501 (57)	I	L	H	L	L	H	L	L	L	L	L
MODE 3	MA-212 Board IC501 (56)	I	H	H	H	L	H	H	H	H	L	L
MODE 4	MA-212 Board IC501 (55)	I	H	H	H	H	H	H	H	H	H	H
REC SAF	MA-212 Board IC501 (78)	I	L	*1	*1	*1	*1	*1	*1	*1	*1	*1
T REEL FG	MA-212 Board IC501 (64)	I	H/L	H/L	H/L	H/L	H/L	H/L	*2	*2	*2	*2
S REEL FG	MA-212 Board IC501 (63)	I	H/L	H/L	H/L	*2	*2	H/L	*2	*2	*2	*2
END LED	MA-212 Board IC501 ㊲	O	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
CAP TRQ1	MA-212 Board IC501 ㉟	O	H	H	H	H	H	H	H	H	H	H
CAP TRQ2	MA-212 Board IC501 ㊱	O	H	H	H	H	H	H	H	H	H	H
$\overline{\text{CAP STOP}}$	MA-212 Board IC501 ㉞	O	L	*5	*5	*5	*5	L	*5	*5	*5	*5
T SENS	MA-212 Board IC501 ⑯	I	*3	*3	*3	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-212 Board IC501 ⑮	I	*3	*3	*3	*6	*6	*6	*6	*6	*6	*6

*1. "L" when erasing protection tab is bent. "H" when not bent.
*2. Pulse of period in proportion to reel rotating speed.
*3. Approx. 2 msec period "H" pulse.
*4. pulse.
*5. 3 value output of "H", "L" and "Hi-Z (2.5 V)".
*6. Nomally "L". 2 msec period "H" pulse when tape top or tape end is detected.

6-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	REC
REC CTL	MA-212 Board IC501 ⑦	O	*14	*14	*14	*14	*14	*14	*1
STEP PLS	MA-212 Board IC501 ⑭	O	L	*2	*2	*2	*2	*2	*2
RF SW POSI *4	MA-212 Board IC501 (62)	I							
$\overline{\text{PB CTL}}$	MA-212 Board IC501 (67)	I	H	*5	*5			*1	*1
DRUM PG	MA-212 Board IC501 (68)	I	*6	*6	*6	*6	*6	*6	*6
DRUM FG	MA-212 Board IC501 (69)	I	*7	*7	*7	*7	*7	*7	*7
CAP FG	MA-212 Board IC501 (70)	I	H/L	*8	*8	*9	*9	*8	*8
CAP RVS	MA-212 Board IC501 (72)	O	H/L	L	H	L	H	L	L
CAP DA *14	MA-212 Board IC501 (73)	O	*11	*11	*11	*11	*11	*12	*12
DRUM DA *4	MA-212 Board IC501 (74)	O	*13	*13	*13	*13	*13	*13	*13
CTL STEP	MA-212 Board IC501 (75)	O	L	L	L	L	L	L	L

*1. 30 Hz pulse.
*2. 3 value output of "H", "L" and Hi-Z (2.5 V).
*3. Unstable period Pulse.
*4. Input terminal for video switching position adjustment.
*5. Pulse of period in proportion to tape speed.
*6. 30 Hz "H" pulse.
*7. 720 Hz pulse.
*8. Pulse of period in proportion to tape speed.
*9. Unstable period pulse
*10. Pulse at tape running.
*11. Approx. 2 msec period "H" or "L" pulse.
*12. Approx. 1.5 msec period "H" or "L" pulse.
*13. Approx. 3 msec period "H" or "L" pulse.
*14. Hi-Z (2.5 V).

6-3. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	I/O level
$\overline{\text{ASURA RESET}}$	MA-212 Board IC501 ㊵	I	Normally "H". "L" when service interruption is detected or restored.
$\overline{\text{ASURA·CS}}$	MA-212 Board IC501 ㊹	I	Always "H".
S IN0	MA-212 Board IC501 ㊺	I	Serial communication data from timer microprocessor.
S OOT0	MA-212 Board IC501 ㊻	O	Serial communication data to timer microprocessor.
$\overline{\text{S CLK O}}$	MA-212 Board IC501 ㊼	I	Serial communication clock with timer microprocessor.

6-4. SYSTEM CONTROL – INPUT SELECTION BLOCK INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	I/O level
LINE 1	MA-212 Board IC501 ⑱	O	Input select control signal.

6-5. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	REC
$\overline{\text{V-PB}}$	MA-212 Board IC501 (100)	O	H	H	H	L	H
HEAD CONT	MA-212 Board IC501 ⑰	O	L	L	L	L	H
RF SWP.	MA-212 Board IC501 ①	O	*2	*2	*2	*2	*2
Q VD	MA-212 Board IC501 ②	O	L	L	L	*3	L
$\overline{\text{SP}}$	MA-212 Board IC501 ⑩	O	*5	*5	*5	*6	*5
REC. P	MA-212 Board IC501 ⑤	O	L	L	L	L	L
REC	MA-212 Board IC501 ⑥	O	L	L	L	L	H
V SYNC	MA-212 Board IC501 (66)	I	*7	*7	*7	*7	*7

*1. "H" when tape stops. "L" when tape runs (approx. for 33 msec).
*2. Syncronized with drum rotation. 30 Hz 50% duty pulse.
*3. Normally "L". "H" when video signal is not generated.
*4. V period "H" pulse.
*5. SP mode: "L", SP mode: "L".
*6. Selected by tape recording mode.
*7. Composite sync signal (positive).
*8. "H" when menu screen or blue back screen.

6-6. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-212 BOARD IC501)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	REC
NA PB	MA-212 Board IC501 (94)	O	L	L	L	H	L
A MUTE	MA-212 Board IC501 (95)	O	L	L	L	L	L
NA REC P	MA-212 Board IC501 ⑬	O	L	L	L	L	H
$\overline{\text{SP}}$	MA-212 Board IC501 ⑩	O	*1	*1	*1	*2	*1

*1. SP mode: "L".
*2. Selected by tape recording mode. SP mode: "L".

6-7. SERVO, SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION (MA-212 BOARD IC501)

Pin. No.	Port	I/O	Name	Function
1	pb5/ppo13	O	RF SWP	Video switching pulse output.
2	pb4/ppo12	O	Q VD	Quasi VD pulse output.
3	pb3/ppo11	O	Q HD ENABLE	Quasi HD control.
4	pb2	O	RENTAL	Rental picture control.
5	pb1	O	REC P	"H" output when video REC.
6	pb0	O	REC	"H" output when REC.
7	pc7	O	REC CTL	REC CTL output.
8	pc6	I	$\overline{\text{CAP TRQ3}}$	Capstan motor drive signal.
9	pc5	O	ORC ON	Video control signal. "H" during APC/OPC data measuring only.
10	pc4	O	$\overline{\text{SP}}$	"L" when SP mode.
11	pc3	I	$\overline{\text{POWER FAIL}}$	"L" when AC OFF.
12	pc2	O	LP	Not used.
13	pc1	O	$\overline{\text{NA REC P}}$	Normal sudio recording control. "H" when REC mode.
14	pc0 /	O	STEP PLS	Step pulse output during SLOW.
15	pj7	I	S SENS	Supply side end sensor input.
16	pj6	I	T SENS	Take-up side end sensor input.
17	pj5	O	HEAD CONT	Head amp IC control signal.
18	pj4	O	LINE 1	Line select signal. "H" when LINE input.
19	pj3	I/O	$\overline{\text{PDC RESET}}$	PDC reset signal. "L" when PDC reset mode. (E400AP)
20	pj2	I/O	$\overline{\text{PDS CS}}$	PDC chip select signal (E400AP)
21	pj1	I/O	SECAM	Not used.
22	pj0	I/O	ME SECAM	"H" when ME SECAM mode, "L" when else.
23	pd7	I	$\overline{\text{DEF}}$	APC/OPC control signal. "L" when default level.
24	pd6	O	TU CLOCK	Serial clock signal for TUNER.
25	pd5	O	TU DATA	Serial data signal for TUNER.
26	pd4	O	TU ENABLE	Serial enable signal for TUNER.
27	pd3	O	DA5	APC/OPC control signal.
28	pd2	O	DA6	APC/OPC control signal.
29	pd1	O	DA7	APC/OPC control signal.
30	pd0	O	DA8	APC/OPC control signal.
31	ph7	O	$\overline{\text{LOAD CAM}}$	CAM motor control signal.
32	ph6	O	EEP RESET	EEPROM reset signal.
33	ph5	O	$\overline{\text{EEP CS}}$	EEPROM chip select signal. "L" when active.
34	ph4	O	$\overline{\text{CAP STOP}}$	Capstan motor drive signal. "L" when STOP.
35	ph3	I	CAP TRQ1	Capstan motor drive signal.
36	ph2	I	CAP TRQ2	Capstan motor drive signal.
37	ph1	O	END LED	Pulse signal for END sensor.
38	ph0	O	OSD ENABLE	OSD enable signal.
39	mp	I	MP (VSS)	Fixed "L" level.
40	$\overline{\text{rst}}$	I	$\overline{\text{ASURA RESET}}$	ASURA reset signal. "L" when reset.

Pin. No.	Port	I/O	Name	Function
41	vss	I	VSS	GND
42	xtal	O	XTAL	System clock 16 MHz.
43	extal	I	EXTAL	System clock 16 MHz.
44	$\overline{\text{cs0}}$	O	$\overline{\text{ASURA CS}}$	ASURA chip select signal.
45	si0	I	S IN 0 (TO ASURA)	Serial input signal.
46	so0	O	S OUT 0 (FROM ASURA)	Serial output signal.
47	$\overline{\text{sck0}}$	I	$\overline{\text{S CLK 0}}$ (TO ASURA)	Serial clock signal.
48	pf7/an11	O	$\overline{\text{NTSC}}$	"L" when NTSC mode.
49	pf6/an10	O	ENV CONT	Envelope level control signal.
50	pf5/an9	O	LP JOG	"H" when PAL LP and JOG mode.
51	pf4/an8	O	SYS CHECK	System check signal.
52	avss	I	AVSS	GND
53	avref	I	AVREF	A/D port reference input. (Equal level to VDD)
54	avdd	I	AVDD	VDD
55	pf3/an7	I	MODE 4	Mecha position signal input.
56	pf2/an6	I	MODE 3	Mecha position signal input.
57	pf1/an5	I	MODE 2	Mecha position signal input.
58	pf0/an4	I	MODE 1	Mecha position signal input.
59	an3	I	DEST/DEW	Destination input. Analog input.
60	an2	I	RF ENV	RF level input. ANALOG input.
61	an1	I	AFT	AFT signal input. ANALOG input.
62	an0	I	RF SW POSI	RF switching position signal input. ANALOG input.
63	pg7	I	S REEL	Supply reel FG signal input.
64	pg6	I	T REEL	Take-up reel FG signal input.
65	pg5	I	$\overline{\text{H DET}}$	H-sync DETECT input.
66	pg4/sync	I	V SYNC	V-sync signal input.
67	$\overline{\text{pg3/pbctl}}$	I	$\overline{\text{PB CTL}}$	Playback Control signal input.
68	pg2/dpg	I	DRM PG	DRUM PG signal input.
69	pg1/dfg	I	DRM FG	DRUM FG signal input.
70	pg0/cfg	I	CAP FG	CAPSTAN FG signal input.
71	pe7	O	$\overline{\text{JOG}}$	"L" when jog mode.
72	pe6	O	CAP RVS	"H" when capstan rotation is reverse.
73	pe5	O	CAP DA	CAPSTAN D/A output.
74	pe4	O	DRUM DA	DRUM D/A output.
75	pe3	O	CTL REC	REC control signal output.
76	pe2	O	CTL STEP	Pulse output during capstan step moving.
77	pe1	I	R/B	Ready and Busy signal.
78	pe0	I	REC SAF	Detection of safety tub of tape.
79	si1	O	PDC CONT	PDC control signal. "H" when PDC is or and power is off. (E400AP)
80	so1	O	EXP SO	Serial data output for EEPROM.

Pin. No.	Port	I/O	Name	Function
81	sck1	I	EXP CLK	Serial clock output for EEPROM.
82	pi4	O	E TAPE	"H" when high RF level tape.
83	pi3	O	BG/DK	TUNER system detect mode.
84	pi2/¯pwm	O	AV CONT	Not used.
85	pi1/rmc	I	RMC	SIRCS signal input.
86	tex	O	TEX	Clock signal input. 32.768 kHz
87	tx	I	TX	Clock signal input. 32.768 kHz
88	vss	I	VSS	GND
89	vdd	I	VDD	VDD
90	n.c.			VDD
91	pa7	O	CW	Way of CAM motor rotation output. "H" is pos, "L" is neg.
92	pa6	O	CAM	CAM motor active signal.
93	pa5	O	POWER ON	"H" during POWERED.
94	pa4	O	NA PB	Normal audio playback signal.
95	pa3	O	A MUTE	Audio mute signal.
96	pa2	O	PAL 60	Not used.
97	pa1	O	SYS RESET	System reset signal.
98	pa0	O	LCD CS	LCD chip select signal.
99	pb7	O	TV/VTR	TV/VTR control signal.
100	pb6/ppo14	O	V PB	Video playback control signal. "L" when Video PB mode.

6-8. LCD DRIVER PIN FUNCTION
(MA-212 BOARD IC201)

Pin. No.	Port	I/O	Name	Function
1	RESET	I	RESET	When L level, IC is reset mode.
2	T0	O	T0	Output signal for front display (grid).
3	T1	O	T1	Output signal for front display (grid).
4	T2	O	T2	Output signal for front display (grid).
5	T3	O	T3	Output signal for front display (grid).
6	T4	O	T4	Output signal for front display (grid).
7	T5	O	T5	Output signal for front display (grid).
8	T6	O	T6	Output signal for front display (grid).
9	T7	O	N.C.	Open.
10	T8	O	N.C.	Open.
11	T9	O	N.C.	Open.
12	T10/S15/PH3	O	S15	Output signal for front display (anode).
13	T11/S14/PH2	O	S14	Output signal for front display (anode).
14	T12/S13/PH1	O	S13	Output signal for front display (anode).
15	T13/S12/PH0	O	S12	Output signal for front display (anode).
16	T14/S11	O	S11	Output signal for front display (anode).
17	T15	O	S10	Output signal for front display (anode).
18	V LOAD	I	V LOAD	− 30 V input.
19	V PRE	I	V PRE	
20	S9	O	S9	Output signal for front display (anode).
21	S8	O	S8	Output signal for front display (anode).
22	S7	O	S7	Output signal for front display (anode).
23	S6	O	S6	Output signal for front display (anode).
24	S5	O	S5	Output signal for front display (anode).
25	S4	O	S4	Output signal for front display (anode).

Pin. No.	Port	I/O	Name	Function
26	VDD	–	VDD	5 V input.
27	S3	O	S3	Output signal for front display (anode).
28	S2	O	S2	Output signal for front display (anode).
29	S1	O	S1	Output signal for front display (anode).
30	S0	O	S0	Output signal for front display (anode).
31	P00/INT4	I	INT4	GND
32	P01/SCK	I	SCK	Serial clock signal.
33	P02/SO	O	CBC → SI	Serial data output for ASURA.
34	P03/¯SCK	I	CBC ← SO	Serial data input from ASURA.
35	P10/INT0	I	INT0	GND
36	P11/INT1	I	CBC CS	Not used.
37	P12/INT2	I	INT2	GND
38	P13/T10	I	T10	GND
39	P20	O	P20	Ouput signal for POWER LED.
40	P21	O	P21	N.C.
41	P22	O	P22	N.C.
42	P23	O	P23	N.C.
43	P30	O	P30	N.C.
44	P31	O	P31	N.C.
45	P32	O	P32	N.C.
46	P33	O	P33	N.C.
47	P60	O	KEY OUT 0	Output signal for function KEY.
48	P61	O	KEY OUT 1	Output signal for function KEY.
49	P62	O	KEY OUT 2	Output signal for function KEY.
50	P63	O	KEY OUT 3	Output signal for function KEY.
51	P40	I	KEY IN 0	Input signal for function KEY.
52	P41	I	KEY IN 1	Input signal for function KEY.
53	P42	I	KEY IN 2	Input signal for function KEY.
54	P43	I	KEY IN 3	Input signal for function KEY.
55	PPO	O	N.C.	Open.
56	X1	–	X1	Main system clock signal 4.19 MHz.
57	X2	–	X2	Main system clock signal 4.19 MHz.
58	GND	–	GND	GND
59	XT1	–	N.C.	Open.
60	XT2	–	N.C.	Open.
61	P50	I	KEY IN 4	Input signal for function KEY.
62	P51	I	KEY IN 5	Input signal for function KEY.
63	P52	I	KEY IN 6	Input signal for function KEY.
64	P53	I	KEY IN 7	Input signal for function KEY.

SECTION 7
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for adjustments on Page 7-4.

7-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT IV. (9-973-623-11)

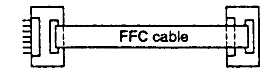
7-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

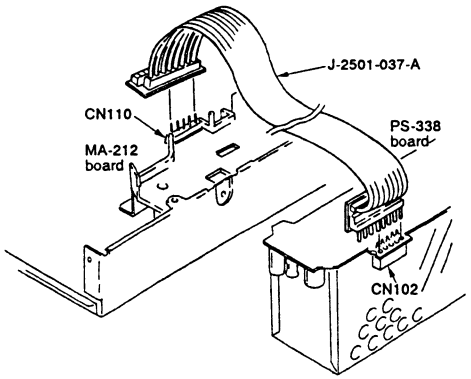
Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used

1) Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) PAL SECAM pattern generators
4) Digital voltmeter
5) Audio level meter
6) Audio generator
7) Attenuator
8) Alignment tape
   Part Code: H7099052H (MH-2)
9) Extension cable



PS-338 (CN102) ↔ MA-212 (CN110)
(J-2501-037-A)



2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

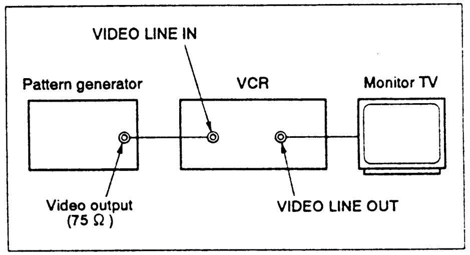


Fig. 7-2-1

2-1-3. Set-up Adjustment

In this adjustment, PAL pattern generator is connected to LINE 1 input signal terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst sigal and "red" signal is 0.30 : 0.66. Fig. 7-2-2 shows video signals (color bars) used in adjusting the video section.

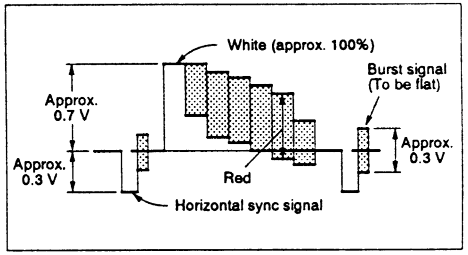


Fig. 7-2-2

2-1-4. Alignment Tape (MH-2)

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6 kHz
2	5 minutes	—	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	—

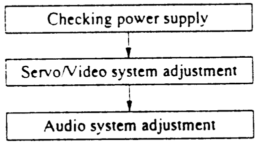
2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video input	EURO-AV :	21-pin (Pin ⑳) 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio inputs	EURO-AV :	21-Pin (Pin ② and ⑥) More than 10 kΩ, − 4 dBs
Video outputs	LINE OUT :	phono jack
	EURO-AV :	21-pin (Pin ⑲) 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio output	EURO-AV :	21-Pin (Pin ① and ③)
	Output impedance :	less than 1 kΩ − 4 dBs with 10 kΩ load

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.


Checking power supply
Servo/Video system adjustment
Audio system adjustment

2-2. POWER SUPPLY CHECK (MA-212 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmeter
SW 12 V check	
Measurement Point	Pin ② of IC121
Specified Value	12.0 ± 0.3 Vdc
MTR 12 V check	
Measurement Point	Cathode of D121
Specified Value	12.4 ± 0.5 Vdc
SW 5 V check	
Measurement Point	Emitter of Q123
Specified Value	5.0 ± 0.2 Vdc
D5 V check	
Measurement Point	Cathode of D502
Specified Value	5.1 ± 0.2 V
+38 V check	
Measurement Point	Pin ⑥ of CP181
Specified Value	38.0 ± 2.5 Vdc
− 29 V check	
Measurement Point	Pin ⑨ of CP181
Specified Value	− 29.0 ± 3.5 Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO/VIDEO SYSTEM ADJUSTMENTS

2-3-1. Switching Position Adjustment (MA-212 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.
Improve the interchangeability with other tapes and sets.
If it is out of order, noise may appear on the playback picture (top or bottom).

Mode	PB
Signal	Alignment tape
Measurement Point	CH1: CNJ001 VIDEO LINE OUT CH2: Pin③ of CN802 (VI-134 board) (RF SWP)
Measuring Instrument	Oscilloscope
Adjusting Element	RV502
Specified Value	6.5 ± 0.5 H (416 ± 32 μsec)

Adjusting Method:

1) Adjust the tracking position to the center by pushing tracking buttons ▲, ▼ (on remote commander).
2) Check that switching position is 6.5 ± 0.5 H. (416 ± 32 μsec)
If not meet the specified value, turn RV502 and repeat steps 1) to 2).

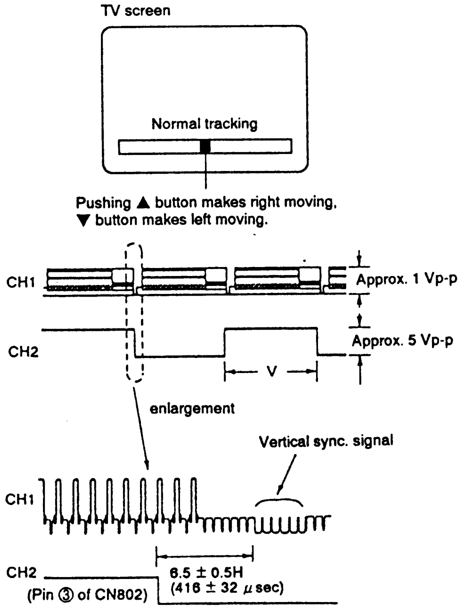

TV screen
Normal tracking
Pushing ▲ button makes right moving, ▼ button makes left moving.
CH1
Approx. 1 Vp-p
CH2
Approx. 5 Vp-p
V
enlargement
Vertical sync. signal
CH1
CH2
(Pin ③ of CN802)
6.5 ± 0.5H
(416 ± 32 μsec)

Fig. 7-2-3

2-3-2. SECAM Discrimination Adjustment (VI-134 Board)

Mode	E-E
Signal	SECAM Color bar
Measurement Point	Pin ⑪ of IC001
Measuring Instrument	oscilloscope
Adjusting Element	RV001
Specified Value	4.8 ± 0.1 Vp-p

Adjusting Method:

1) Adjust RV001 so that the amplitude of 1/2 fh waveform becomes 4.8 ± 0.1 Vp-p.

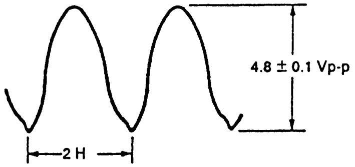


Fig. 7-2-4

2-3-3. VCO Frequency Adjustment (MA-212 Board)

Purpose:

Adjust to set the character position on the screen.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ㉖ of IC601
Measuring Instrument	Oscilloscope (DC mode)
Adjusting Element	CT601
Specified Value	+2.45 ± 0.05 V

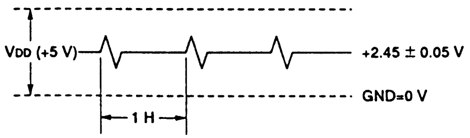

VDD (+5 V)
+2.45 ± 0.05 V
GND=0 V
1 H

Fig. 7-2-5

2-4. AUDIO SYSTEM ADJUSTMENTS

[Connection]

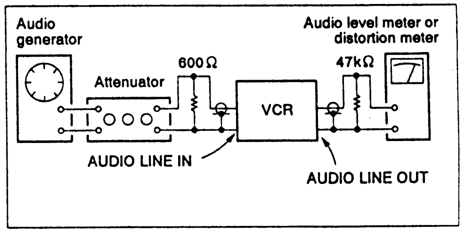

Audio generator
Audio level meter or distortion meter
600 Ω
47kΩ
Attenuator
VCR
AUDIO LINE IN
AUDIO LINE OUT

Fig. 7-2-6

2-4-1. Normal Audio System Adjustments

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT IV.

2. Recording Bias Adjustment (MA-212 Board)

Mode	REC and PB
Signal	400 Hz, − 27.5 dBs 7 kHz, − 27.5 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter
Adjusting Element	RV301
Specified Value	0 ± 2 dB

Adjusting Method:

1) Supply a signal of 400 Hz, − 27.5 dBs to Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate − 27.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output levels within a range of the 400 Hz playback output level 0 ± 2 dB. If it is out of this range, adjust RV301 and repeat the steps 1) through 7) above.

2-3-2. SECAM Discrimination Adjustment (VI-134 Board)

Mode	E-E
Signal	SECAM Color bar
Measurement Point	Pin ⑪ of IC001
Measuring Instrument	oscilloscope
Adjusting Element	RV001
Specified Value	4.8 ± 0.1 Vp-p

Adjusting Method:

1) Adjust RV001 so that the amplitude of 1/2 fh waveform becomes 4.8 ± 0.1 Vp-p.

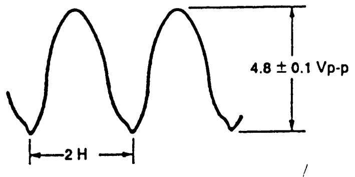


Fig. 7-2-4

2-3-3. VCO Frequency Adjustment (MA-212 Board)

Purpose:

Adjust to set the character position on the screen.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ㉖ of IC601
Measuring Instrument	Oscilloscope (DC mode)
Adjusting Element	CT601
Specified Value	+2.45 ± 0.05 V

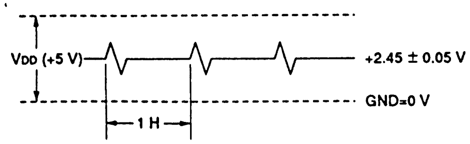


Fig. 7-2-5

2-4. AUDIO SYSTEM ADJUSTMENTS

[Connection]

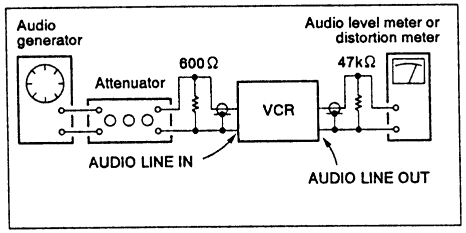

Audio generator
Attenuator
600 Ω
VCR
47kΩ
Audio level meter or distortion meter
AUDIO LINE IN
AUDIO LINE OUT

Fig. 7-2-6

2-4-1. Normal Audio System Adjustments

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT IV.

2. Recording Bias Adjustment (MA-212 Board)

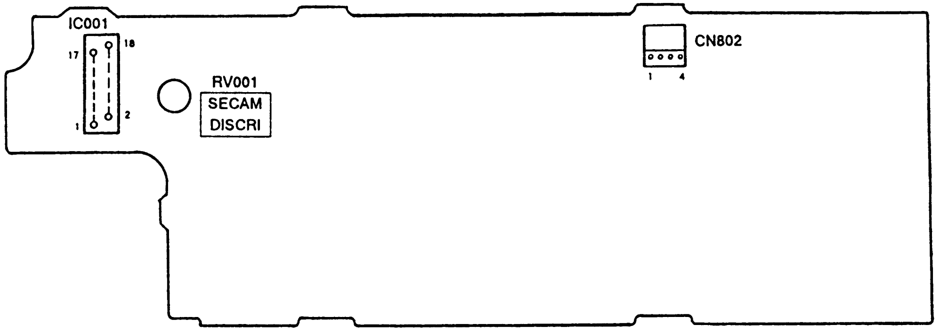
Mode	REC and PB
Signal	400 Hz, − 27.5 dBs 7 kHz, − 27.5 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter
Adjusting Element	RV301
Specified Value	0 ± 2 dB

Adjusting Method:

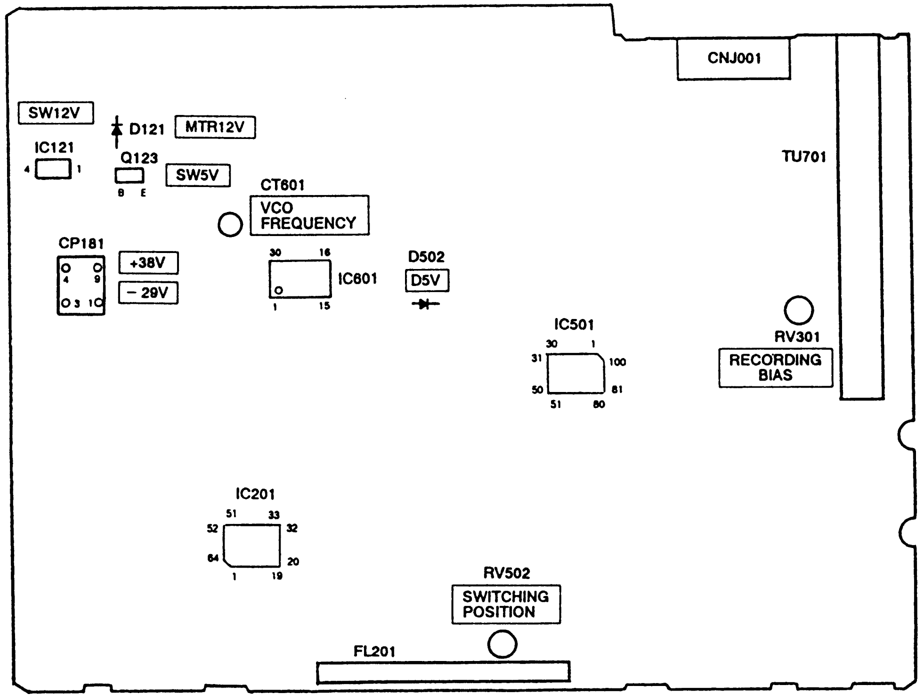
1) Supply a signal of 400 Hz, − 27.5 dBs to Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate − 27.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output levels within a range of the 400 Hz playback output level 0 ± 2 dB. If it is out of this range, adjust RV301 and repeat the steps 1) through 7) above.

2-5. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

VI-134 (CONDUCTOR SIDE)


IC001
17
18
1
2
RV001
SECAM DISCRI
CN802
1
4

MA-212 BOARD (CONDUCTOR SIDE)


CNJ001
SW12V
D121
MTR12V
IC121
4
1
Q123
B
E
SW5V
TU701
CT601
VCO FREQUENCY
CP181
4
9
3
10
+38V
− 29V
30
16
IC601
1
15
D502
D5V
IC501
30
1
31
100
50
81
51
80
RV301
RECORDING BIAS
IC201
51
33
52
32
64
20
1
19
RV502
SWITCHING POSITION
FL201